American Journal of Diseases of Children

VOLUME 54 DECEMBER 1937 NUMBER 6

COPYRIGHT, 1937, BY THE AMERICAN MEDICAL ASSOCIATION

PATHOGENESIS OF TETANY OF THE NEW-BORN

HARRY BAKWIN, M.D.

NEW YORK

In 1913 Kehrer [1] described a group of new-born infants with convulsions, flexor contractions of the extremities, carpal spasms and positive facial and Trousseau signs. Rapid improvement followed the administration of calcium salts. He believed the condition to be tetany of the new-born. Somewhat earlier Bliss [2] had described an infant of 6 days with electrical reactions pathognomonic of tetany and Yanase [3] had observed two infants, aged 12 and 15 days, respectively, with anodal hyperexcitability, one of whom showed a cathodal opening contraction with less than 5 milliamperes at the age of 29 days. Despite these observations it was generally believed that tetany does not occur in the new-born.

Interest in this subject was revived by the reports of Shannon [4] and Bass and Karelitz.[5] In 1931 the latter described three new-born infants with convulsions, general hyperirritability and exaggerated facial and Trousseau signs who showed dramatic improvement after the intravenous injection of calcium gluconate. Though their cases cannot properly be included as instances of tetany because of the lack of determinations of the serum calcium content (the serum calcium content, determined in only one case, was 8.5 mg. per hundred cubic centimeters), their paper served to focus attention on this subject and led to the definite establishment of the syndrome.

From the Children's Medical Service and the Department of Pediatrics and the Department of Obstetrics and Gynecology (Third Surgical Division), Bellevue Hospital, New York University.

1. Kehrer, E.: Die geburtshilflich-gynäkologische Bedeutung der Tetanie, Arch. f. Gynäk. **99**:372, 1913.

2. Bliss, R. W.: Eine Untersuchung über die Epithelkörperchen mit besonderer Berücksichtigung ihrer Beziehungen zur Säuglings-Tetanie, Ztschr. f. Kinderh. **2**:538, 1911.

3. Yanase, J.: Ueber Epithelkörperchenbefunde bei galvanischer Uebererregbarkeit der Kinder, Jahrb. f. Kinderh. **67**:57, 1908.

4. Shannon, W. R.: Tetany, Generalized Edema and Cerebral Compression in the New-Born, Arch. Pediat. **48**:153, 1931.

5. Bass, M. H., and Karelitz, S. J.: Tetany Accompanied by Hyperpyrexia and Vomiting in the First Days of Life, J. A. M. A. **97**:1372 (Nov. 7) 1931.

During the past four years a large number of reports of tetany in the new-born have appeared in the American literature. Though in many cases the diagnosis is open to question, a considerable number of cases remain in which it was established by determination of the blood calcium. We have assembled from the literature nineteen cases,[6] to which we add four in which we personally observed the patient. The diagnostic criterion has been a reduction in the serum calcium content to less than 8 mg. per hundred cubic centimeters of serum.

Tetany without hypocalcemia occurs as alkalosis tetany, oxalate tetany and citrate tetany. Citrate tetany may be induced experimentally by the injection of sodium citrate.[7] Alkalosis tetany may be induced in three ways: by the injection of sodium bicarbonate ($NaHCO_3$), by obstruction at the pylorus and by hyperventilation. In order to establish a diagnosis of tetany in the presence of a normal or elevated serum calcium content, changes in the electrical reactions must be demonstrated. Up to the present this has not been done with infants. The cases of tetany following the injection of sodium bicarbonate reported by Howland and Marriott[8] were apparently instances of tetany due to a latent deficiency of vitamin D made manifest by the alkali, since in all three cases the serum calcium content was reduced. The occurrence of gastric tetany in infants is unlikely. Though a marked reduction in the amount of plasma chlorides occurs with severe vomiting,[9] the kidneys of infants are apparently able to excrete a corresponding amount of alkali, so that no shift in the p_H of the blood occurs. Thus in the infant with high intestinal obstruction described by Hartmann and Smyth[9a] a plasma chloride content of 44 milliequivalents (normal value, about 100 milliequivalents) was unaccompanied by a shift in the p_H of the blood, which

6. (*a*) Small, A.: J. Pediat. **2**:681, 1933. (*b*) Guild, H.: Internat. Clin. **3**: 46, 1933. (*c*) Maslow, H. L.: Arch Pediat. **50**:768, 1933. (*d*) Craig, J. D.: J. Pediat. **4**:219, 1934. (*e*) Rothstein, J. L.: ibid. **5**:341, 1934; **6**:644, 1935; Unusual Case of Low Calcium Tetany Without Convulsions in a New-Born Infant, J. A. M. A. **105**:1189 (Oct. 12) 1935. (*f*) Gaberman, quoted by Bass, M. H.: M. Clin. North America **17**:1241, 1934. (*g*) Hellman, A. M., and Rothstein, J. L.: Am. J. Obst. & Gynec. **29**:686, 1935. (*h*) Greenwald, H. M., and Palinsky, M.: Acta pædiat. **17**:386, 1935. (*i*) Snelling, C. E.: J. Pediat. **7**:465, 1935. (*j*) von Hofe, F. H., and Jennings, R. E.: ibid. **8**:348, 1936. (*k*) Tumpeer, I. H.: Tetany of the New-Born, with Deposit of Calcium Following Parenteral Administration, Am. J. Dis. Child. **51**:219 (Jan.) 1936. (*l*) Starin, I.: Arch. Pediat. **52**:489, 1935.

7. Shelling, D. H., and Maslow, H. L.: The Effect of Sodium Citrate, Acetate and Lactate on the Ultrafiltrability of Serum Calcium, J. Biol. Chem. **78**:661, 1928.

8. Howland, J., and Marriott, W. M.: Observations upon the Calcium Concentration of the Blood in Infantile Tetany and upon the Effect of Treatment by Calcium, Quart. J. Med. **2**:289, 1917-1918.

9. (*a*) Hartmann, A. F., and Smyth, F. S.: Chemical Changes in the Body Occurring as the Result of Vomiting, Am. J. Dis. Child. **32**:1 (July) 1926. (*b*) Morris, N., and Graham, S.: Observations on the Chloride Metabolism in Congenital Pyloric Stenosis, Arch. Dis. Childhood **6**:27, 1931. (*c*) Schnohr, E.: Chemical Changes in the Blood and Tissues in Congenital Hypertrophic Pyloric Stenosis, Acta pædiat. **14**:49, 1932. (*d*) Bass, M. H.: M. Clin. North America **17**:1241, 1934.

was 7.4. Gastric tetany has never been demonstrated in infants, even with the severe and persistent vomiting associated with pyloric stenosis. Hyperventilation tetany has only been observed clinically in adults with encephalitis or hysteria.

REPORT OF CASES

CASE 1.—C. G., a girl, was born on April 28, 1936, at the New York Infirmary for Women and Children. She was the second child of Italian parents. The sibling was living and well. The mother felt well during pregnancy except for occasional headaches and vomiting. She had dental caries, which progressed somewhat during pregnancy. There was moderately severe gingivitis, which at the time of delivery was somewhat improved. The mother's blood pressure and urine were normal on repeated examinations. The Wassermann reaction was negative and the hemoglobin content 70 per cent. During pregnancy the mother's appetite was good; she drank about two glasses of milk a day but had received no vitamin D supplement.

The infant was born at term. She weighed 2.6 Kg. and was 48 cm. long. On the first day she received dextrose, and after sixteen hours she was given breast milk, with a complementary feeding of a preparation of milk, water and dextrimaltose. The complementary feeding was discontinued on the fourth day of life, and from then until the eighth day the infant was nursed entirely.

On May 4 she was 7 days old and weighed 2.7 Kg. Twitching of the right arm and leg followed by generalized convulsions was noticed. These symptoms continued during the next five days. There was a positive but not exaggerated Chvostek reaction. On May 5 breast feeding was discontinued, and the infant was offered a mixture consisting of equal parts of cow's milk and water with 3 per cent dextrimaltose added. There was no jaundice or fever.

On May 8 the serum calcium was 6.8 mg. per hundred cubic centimeters, the serum phosphorus 9.7 mg., the serum phosphatase 7 units, the blood sugar 80 mg. and the serum protein 5.8 Gm. The electrical reactions were entirely normal. On the same day the calcium content of the mother's serum was 9.8 mg. and the phosphorus content 3.4 mg. The administration of viosterol (40 drops daily) was started. Roentgenograms of the long bones were normal.

On May 9 the infant left the hospital. She was receiving viosterol but had had no sedative. There were no twitchings or convulsions after she left the hospital, and she progressed normally.

CASE 2.—On April 20, 1936, S. C., a boy 16 days old, was admitted to the New York Infirmary for Women and Children because of twitching of the limbs, generalized convulsions and jaundice. He was the first child of Albanian parents.

The mother was first seen in the eighth month of pregnancy. She complained of severe headaches, which occurred two or three times a week and lasted twenty-four hours, flashes of light, diplopia and vertigo. She often felt faint. The blood pressure and the urine were normal. She had a generally contracted pelvis, numerous carious teeth and a white sector-shaped defect in both optic disks. Her Wassermann reaction was negative. On April 4 she delivered an apparently healthy infant. At the time of delivery she was feeling better. Her appetite was fair, but she had taken little milk during her pregnancy and no additional vitamin D. Her hemoglobin content was 76 per cent.

The infant was born at term. He weighed 2.6 Kg. and was 47 cm. long. The day following birth he was put to the breast and was given a complementary feeding of a preparation containing one-third cow's milk and 1.5 per cent dextri-

maltose. The formula was discontinued after three days, and thereafter the infant was entirely breast fed until discharged from the hospital on the ninth day, when he weighed 2.8 Kg.

When 5 days old he contracted jaundice and was given a small dose of mild mercurous chloride. His hemoglobin content at this time was 105 per cent. The jaundice gradually diminished and had almost entirely disappeared by the time he was discharged.

On April 19, when the child was 15 days old, repeated generalized convulsions developed. He was readmitted to the hospital on the following day. His weight was 3.2 Kg. He was entirely breast fed and had received neither orange juice nor cod liver oil. He was moderately jaundiced. The serum calcium content was 7 mg. per hundred cubic centimeters and the icterus index 47. The infant was given small doses of calcium and sodium bromide.

On May 1 the convulsions and twitchings persisted. There was no facial reaction; the peroneal reaction was doubtfully positive. The electrical reactions on both the peroneal and the ulnar nerve were entirely normal. The blood serum was turbid (lipemic) and highly colored. The calcium content of the serum was 5.8 mg. per hundred cubic centimeters, the inorganic phosphate content 7.5 mg. and the phosphatase content 16.6 units. On the following day another specimen of serum showed the same appearance. The calcium content was 6.5 mg., the inorganic phosphate content 8.9 mg. and the phosphatase content 20 units. The blood sugar content was 67 mg. per hundred cubic centimeters and the serum protein content 5.4 per cent. Roentgenograms of the long bones showed them to be normal. The mother's serum calcium content was 10.6 mg. Forty drops of viosterol was given daily. Convulsive twitchings were observed on the day following the first dose but were not observed afterward. The infant was last seen in January 1937, at which time he was 7 months old and appeared entirely normal.

CASE 3.—J. R., a white boy of Puerto Rican parentage, was born on May 11, 1936, at full term, weighing 2.3 Kg. He was the fifth child of normal parents. The mother had received no vitamin D supplement during pregnancy.

Several hours after birth the infant had a cyanotic spell, from which he recovered without recurrence. He had considerable difficulty in grasping the nipple and was therefore given a milk dilution after the first day. There was moderate jaundice. The weight fell to 2 Kg. on the fourth day, after which the infant gained slowly.

On May 20 he was 9 days old and weighed 2.1 Kg. There was no clinical evidence of tetany. The electrical reactions were normal. The calcium content of the serum was 7.6 mg. per hundred cubic centimeters, the inorganic phosphorus content 8.3 mg. and the phosphatase content 6.4 units. Roentgenograms of the long bones showed them to be normal.

The infant received neither calcium nor vitamin D. On May 29 the calcium content of the serum was 9.8 mg., the inorganic phosphorus content 8.3 mg. and the phosphatase content 6.3 units. The infant was discharged on June 1, weighing 2.21 Kg. and appearing entirely normal.

CASE 4.—M. C., a white boy, was born on June 22, 1936, weighing 2.8 Kg. The mother had active tuberculosis, and the infant was therefore artificially fed after the first day. The weight fell to 2.6 Kg. on the third day, and thereafter the infant gained slowly. The mother had received no vitamin D supplement during pregnancy.

On June 26 the infant was 4 days old. He was very "jumpy." The Chvostek and the peroneal reactions were not exaggerated. The electrical reactions showed

an anodal opening contraction with 2 milliamperes and an anodal closing contraction with 4 milliamperes. A cathodal opening contraction was not obtained with 7 milliamperes. The calcium content of the serum was 5.8 mg. per hundred cubic centimeters, the inorganic phosphorus content 7.2 mg. and the phosphatase content 4.9 Bodansky units. Roentgenograms of the long bones were normal. One gram of calcium gluconate was given four times a day for four days. On July 9 the calcium content of the serum was 8.9 mg., the inorganic phosphorus content 7.5 mg. and the phosphatase content 9.4 units. The child was discharged from the hospital on July 12, apparently well.

CLINICAL FEATURES

Tetany of the new-born affects full term as well as prematurely born infants. It may occur at any time during the neonatal period, appearing in four of the twenty-three cases on the first day of life. In the relatively small number of cases reported males and females were equally affected. In the two infants who died cerebral hemorrhage was observed.

On the whole, the symptoms of tetany in the new-born and in older infants are similar. Tetany in the new-born may be latent, i. e., symptomless, the syndrome being suspected because of an active facial reaction; it may be discovered accidentally through a determination of the calcium content of the blood, or it may present manifest symptoms, most commonly convulsions and twitchings. The facial and the peroneal reaction may or may not be exaggerated. A heightened response to sensory stimuli such as loud sounds or jarring of the bed has been observed in new-born as well as in older infants with tetany. Carpopedal spasm is occasionally seen, and a number of the infants have fever. Laryngospasm is rare, having occurred in only three of the twenty-three patients.

There is no clinical or roentgenologic evidence of rickets. The reduction in the serum calcium content may be marked; in some instances the value is below 6 mg. per hundred cubic centimeters. The serum phosphorus content is usually elevated, but it may be within normal limits. The serum phosphatase content, unlike that in the tetany of later infancy, is unchanged.[10] In one of the four patients observed by us the electrical reactions were abnormal (anodal opening contraction at 2 milliamperes) but not pathognomonic (cathodal opening contraction at less than 5 milliamperes). In the other three the electrical reactions were normal.

The parents are ordinarily healthy, and in at least two of the reported cases[11] the mother received vitamin D supplements during part of the pregnancy.

---

10. The serum phosphatase content of seventeen healthy new-born infants varied from 4.9 to 9.5 units, with a mean value of 6.6 units.

11. Rothstein.[6e] Snelling.[6i]

Diagnosis.—None of the clinical features is pathognomonic. A facial twitch when the malar bone is tapped (the Chvostek reaction) is frequently observed in the new-born and varies considerably in intensity without relation to the serum calcium content. The convulsions differ in no respect from convulsions of nontetanic origin. More distinctive than convulsions but much less frequently encountered is carpopedal spasm. We observed this symptom in an infant with chronic meningitis, the serum calcium content being normal, and Reuss [12] mentioned a new-born infant with characteristic carpopedal spasm who at autopsy showed a subdural hematoma. Laryngospasm, also an unusual symptom in the neonatal period, was observed by Munro [13] as a prominent symptom in three new-born infants with intracranial hemorrhage. No estimations of the blood calcium content were made in these cases; so the possibility of associated tetany cannot be excluded.

Tetany should be suspected in every new-born infant who has convulsions or twitchings or who is unusually reactive to sensory stimuli. A diagnosis of tetany is made when the serum calcium content is below 8 mg. per hundred cubic centimeters.

Prognosis and Treatment.—The prognosis is good. A permanent cure can be promptly effected by the administration of calcium. Unless convulsions are severe or continuous, calcium may be given by mouth as the chloride (well diluted), lactate or gluconate. When a quick result seems desirable, calcium should be given intravenously, preferably as the gluconate. Intramuscular injection is inadvisable for the new-born. Von Hofe and Jennings [6j] and Tumpeer [6k] have observed calcification of the subcutaneous tissues with abscess formation following the intramuscular injection of calcium gluconate. We have had a similar experience and have heard of others. In our case (case 4) scleroderma neonatorum became evident after the intramuscular injection of calcium gluconate.

PATHOGENESIS

The forms of tetany may be divided into two groups, depending on the presence or absence of hypocalcemia. Tetany without hypocalcemia has been discussed. Hypocalcemic tetany occurs after parathyroidectomy; after the injection or ingestion of phosphates, particularly the alkaline salts; as a result of a deficiency of sunlight and vitamin D (tetany of infants, endemic tetany and tetany associated with osteomalacia), and in persons with disease of the upper part of the intestinal tract, such as celiac disease, sprue or chronic pancreatitis.

12. Reuss, A.: The Diseases of the New-Born, New York, William Wood & Co., 1920, p. 343.

13. Munro, D.: Three Cases of Laryngeal Spasm Associated with Intracranial Hemorrhage in the New-Born, Ann. Otol., Rhin. & Laryng. **34**:677, 1925-1926.

There is no reason to believe that tetany in the new-born is related to disease of the upper part of the intestinal tract. In the latter condition disturbance of the intestinal digestion of fat results on the one hand in failure to absorb vitamin D in adequate amounts, with a consequent deficiency of vitamin D, and on the other hand in failure to absorb calcium, due to a combination of fatty acids and calcium to form relatively insoluble calcium soaps.

Relation of Tetany of the New-Born to Parathyroid Deficiency.—Tetany following parathyroidectomy has frequently been induced experimentally in animals and has been observed in man following the accidental removal of the parathyroids during thyroidectomy. Spontaneous disease due to parathyroid deficiency has also been described. That tetany in infants may be related to parathyroid deficiency was suggested by Yanase,[3] who was able to demonstrate hemorrhages in the parathyroids in a considerable proportion of new-born infants. It was shown,[14] however, that such hemorrhages occurred as frequently in

TABLE 1.—*The Calcium Content and the Phosphorus Content of the Serum During the Neonatal Period*

	Serum Calcium, Mg. per 100 Cc.			Serum Phosphorus, Mg. per 100 Cc.		
Age, Days	Number of Cases	Mean	Standard Deviation	Number of Cases	Mean	Standard Deviation
Cord blood	300 [15]	11.00	0.92	60 [16]	5.98	0.95
0-2	7	10.29	....	7	5.70	....
3-5	31	9.76	0.66	30	6.14	0.82
6-10	23	10.36	0.50	24	6.84	0.62

normal infants as in those in whom tetany was suspected. Fresh and old hemorrhages, blood cysts and blood pigment are frequent in the parathyroids of infants dying of the most varied diseases, occurring in about 30 per cent., Some of the hemorrhages occur during the neonatal period and some later. In the new-born infant with tetany described by Guild [6b] no changes in the parathyroid glands were observed at autopsy.

During the first few days of life a fall in the serum calcium content occurs with great regularity (table 1). At birth the content is high (cord blood), averaging 11 mg. per hundred cubic centimeters.[15] In sixty-one determinations on new-born infants between the first and the tenth day of life, only three values exceeded the mean value for the placental serum calcium. The maximum drop is reached from the third

14. Grosser, P., and Betke, R.: Ztschr. f. Kinderh. **1**:458, 1911. Hartwich, A.: Virchows Arch. f. Path. Anat. **236**:61, 1922. Danisch, F.: Frankfurt. Ztschr. f. Path. **33**:380, 1926.

15. Bakwin, H., and Bakwin, R. M.: Factors Influencing the Calcium Concentration in the Serum of New-Borns, Am. J. Hyg. **15**:766, 1932.

to the fifth day of life (mean, 9.76 mg.), after which the serum calcium rises to a mean value of 10.36 mg., remaining, however, significantly below the mean for placental serum.

Coincident with the variations in the serum calcium content there is a steady rise in the serum phosphorus content from a mean value of 5.98 mg. per hundred cubic centimeters for placental serum [16] to 6.14 mg. from the third to the fifth day and 6.84 mg. from the sixth to the tenth day.

There appears, therefore, to be a trend during the neonatal period toward a lowering of the serum calcium content and an elevation of the serum phosphorus content. If tetany of the new-born were due to hemorrhage into the parathyroids one would hardly anticipate a general depression of the serum calcium content but would rather expect a lowering in an occasional infant, with the general level remaining unchanged.

It is possible, however, that parathyroid hypofunction on a basis other than hemorrhage may be a factor in this form of tetany. During pregnancy there is histologic evidence of hyperactivity of the maternal parathyroid glands,[17] and the blood of pregnant women contains increased amounts of a substance which behaves pharmacologically like parathyroid hormone.[18] It is conceivable that parathyroid activity in the fetus is in abeyance in response to the maternal overactivity. In the interval between the disappearance of maternal parathyroid hormone from the new-born infant's blood and the assumption of normal function by the infant's parathyroids, a fall in the new-born infant's serum calcium content is to be expected. There may be an analogy here to the hormonal interchange between mother and fetus which occurs in diabetes, in which the fetal islands of Langerhans become enlarged and hyperactive in response to the maternal hyperglycemia.

The possibility of an exchange of parathyroid hormone between mother and fetus has been investigated by Hoskins and Snyder.[19] They injected into dog fetuses in utero large amounts of parathyroid extract and observed a rise in the calcium content of the fetal serum. The calcium content of the maternal serum, however, remained unchanged. Injection of parathyroid extract into the mother resulted in a rise in

16. Mull, J. W.: Variations in Serum Calcium and Phosphorus During Pregnancy, J. Clin. Investigation **15**:513, 1936.

17. Ritter, C.: Frankfurt. Ztschr. f. Path. **24**:137, 1920. Seitz, L.: Arch. f. Gynäk. **89**:53, 1909.

18. Hoffmann, F.: Arch. f. Gynäk. **153**:181, 1933. Hoffmann, F., and Rhoden, F.: ibid. **156**:459, 1934. Hamilton, B.; Dasef, L.; Highman, W. J., Jr., and Schwartz, C.: Parathyroid Hormone in the Blood of Pregnant Women, J. Clin. Investigation **15**:323, 1936.

19. Hoskins, F. M., and Snyder, F. F.: The Placental Transmission of Parathyroid Extract, Am. J. Physiol. **104**:530, 1933.

both the maternal and the fetal value. From these studies they concluded that parathyroid hormone does not pass from fetus to mother; but whether it passes from mother to fetus remained undecided, since the fetal hypercalcemia following maternal injection may have been due to passage of parathyroid hormone from mother to fetus or may have been simply a response to the maternal hypercalcemia.

In earlier studies Snyder and Hoskins [20] showed that when rabbit fetuses were given intramuscular and intraperitoneal injections of large doses of insulin there was no hypoglycemia in the mother. Since it is now known that insulin passes from fetus to mother,[21] the significance of these interesting studies must be interpreted with caution.

In table 2 the serum calcium content of cord blood is compared with that of blood drawn from two to four hours after birth. During this brief interval there occurs regularly a fall in the serum calcium

TABLE 2.—*Variations in the Serum Calcium Content from Two to Twenty-Four Hours After Birth*

	Serum Calcium, Mg. per 100 Cc.			Interval Between Birth and Withdrawal of "First Day" Blood, Hours
	Cord Blood	First Day	24 Hours After Birth	
C	11.2	10.3	9.6	2
McC	11.9	9.8	9.5	2½
S	11.0	10.0	...	2¾
S	12.0	10.0	10.0	3
M	10.7	9.5	9.5	3
V	10.6	9.1	9.1	4
S	10.5	10.0	9.7	4½
Mean	11.13	9.81	9.57	3.1

content; in the seven cases studied the fall varied from 0.5 to 2.1 mg. of calcium per hundred cubic centimeters of serum (mean drop 1.3 mg.). It is difficult to explain these findings on any basis other than parathyroid deficiency.

Of interest in this connection is the small amount of phosphorus in the urine of new-born infants observed by a number of workers. Schloss and Crawford [22] found that an appreciable but small amount of phosphorus is present in the urine of the new-born during the first three days of life. During the second three days the amount falls, and during the third three days there is a slight increase, the amount, how-

20. Snyder, F. F., and Hoskins, F. M.: The Placental Transmission of Adrenalin, Insulin and Pituitrin, Anat. Rec. **35**:23, 1927.

21. Carlson, A. J., and Drennan, F. M.: Control of Pancreatic Diabetes in Pregnancy by the Passage of the Internal Secretion of the Pancreas of the Fetus to the Blood of the Mother, Am. J. Physiol. **28**:391, 1911.

22. Schloss, O. M., and Crawford, J. L.: The Metabolism of Nitrogen, Phosphorus and the Purin Substances in the New-Born, Am. J. Dis. Child. **1**:203 (March) 1911.

ever, not reaching the initial value. According to Greenwald [23] and Shelling [24] one of the most striking features of hypoparathyroidism is the reduction in the output of phosphorus in the urine.

Relation to Phosphate Tetany.—Binger in 1917 [25] induced hypocalcemic tetany in dogs by the intravenous injection of neutral or alkaline phosphate. It was later shown that this condition could also be brought about by means of acid phosphate, but the amount necessary was much larger, probably because of the acidosis induced. Salvesen, Hastings and McIntosh [26] with dogs and Jeppsson and Klercker [27] with infants obtained similar results by the oral administration of phosphate. Rohmer and Woringer [28] showed that tetany may be readily induced in infants who already have a disturbance of calcium metabolism (e. g., rickets) but that the ingestion of phosphate has no marked effect on normal infants.

Shelling and Asher [29] found that parathyroidectomized rats can be kept free from tetany by reduction of the phosphorus in the diet and that tetany can be induced by adding phosphorus to an otherwise optimal ration. The same fact has been observed regarding patients with parathyroid insufficiency.[30]

There is some reason to believe that phosphate is a factor in the tetany of the new-born. During the first few days of life little if any food is taken. Cavins [31] has shown that rachitic rats readily acquire tetany on fasting. The tetany in his animals has been attributed to the endogenous release of phosphorus from the tissues during the fast, and

---

23. Greenwald, I.: The Effect of Parathyroidectomy upon Metabolism, Am. J. Physiol. **28**:103, 1911.

24. Shelling, D. H.: The Parathyroids in Health and in Disease, St. Louis, C. V. Mosby Company, 1935, p. 79.

25. Binger, C.: Toxicity of Phosphates, in Relation to Blood Calcium and Tetany, J. Pharmacol. & Exper. Therap. **19**:105, 1917.

26. Salvesen, H. A.; Hastings, A. B., and McIntosh, J. F.: Blood Changes and Clinical Symptoms Following Oral Administration of Phosphates, J. Biol. Chem. **60**:311, 1924.

27. Jeppsson, K., and Klercker, K. O.: Untersuchungen über die Bedeutung der Alkaliphosphate für die Spasmophilie, Ztschr. f. Kinderh. **28**:71, 1921.

28. Rohmer, P., and Woringer, P.: L'action du phosphate de soude sur la calcémie du nourrisson, Compt. rend. Soc. de biol. **89**:575, 1923.

29. Shelling, D. H., and Asher, D. E.: The Effect of Calcium and Phosphorus of the Diet on Tetany, Serum Calcium, and Food Intake of Parathyroidectomized Rats, J. Biol. Chem. **96**:195, 1932.

30. Shelling, D. H., and Goodman, M. J.: The Importance of Low Dietary Phosphorus in the Treatment of Parathyroid Tetany, J. A. M. A. **102**:669 (March 3) 1934. Ellsworth, R.: Observations upon a Case of Post-Operative Hypoparathyroidism, Bull. Johns Hopkins Hosp. **52**:131, 1933.

31. Cavins, A. W.: The Effect of Fasting (and Refeeding) on the Calcium and Inorganic Phosphorus in Blood Serums of Normal and Rachitic Rats, J. Biol. Chem. **59**:237, 1924.

Karelitz and Shohl [32] have been able to induce tetany in rachitic rats by the addition of phosphate to their diets.

The mechanism by which phosphate leads to hypocalcemia is not clear. It has been suggested that phosphate removes calcium from the body fluids by combining with it to form insoluble salts in the lower part of the intestinal tract, thereby preventing the reabsorption of calcium. This hypothesis is supported by the observations of Greenwald and Gross,[33] who found that the injection of sodium phosphate led to an increase in the excretion of calcium in the urine and stools of dogs. According to Orr, Holt, Wilkins and Boone,[34] the fecal excretion of calcium by infants is increased after the ingestion of phosphate. Farquharson, Salter and Aub,[35] however, found no increase in the excretion of calcium by adults after the oral administration of large amounts of phosphate.

That phosphate is an important factor influencing the serum calcium content of new-born infants is evidenced by their marked response to the ingestion of phosphate.

An aqueous solution of sodium phosphate U. S. P. (Na_2HPO_4) was prepared and sterilized and the amount of phosphorus determined by the method of Fiske and Subbarow.[36] The solution was given by nasal catheter after removal of the gastric contents. Blood for determination of the serum calcium and phosphorus was drawn immediately before and two hours after the administration of phosphate.

In table 3 the effect of various amounts of inorganic phosphate, orally administered, on the calcium content and the inorganic phosphate content of the serum of new-born infants is shown. With all doses of phosphate used the serum calcium content fell and the serum phosphorus content rose. The greatest change was observed in the infant who received 220 mg. of phosphorus per kilogram of body weight. The calcium content of this infant's serum fell from 10.7 to 7.2 mg., and the phosphorus content rose from 6.9 to 16.1 mg. The least change was noted in the infants who received 31 mg. of phosphorus per kilogram.

32. Karelitz, S. J., and Shohl, A. L.: The Effect of Phosphate Added to the Diet of Rachitic Rats, J. Biol. Chem. **73**:665, 1927.

33. Greenwald, I., and Gross, J.: The Excretion of Calcium, Phosphorus and Magnesium After the Injection of Calcium Chloride, Sodium Phosphate, or Both, J. Biol. Chem. **66**:201, 1925.

34. Orr, W. J.; Holt, L. E., Jr.; Wilkins, L., and Boone, F. H.: The Relation of Calcium and Phosphorus in the Diet to the Absorption of These Elements from the Intestine, Am. J. Dis. Child. **28**:574 (Nov.) 1924.

35. Farquharson, R. F.; Salter, W. T., and Aub, J. C.: The Effect of Ingestion of Phosphates on the Excretion of Calcium, J. Clin. Investigation **10**:251, 1931.

36. Fiske, C. H., and Subbarow, Y.: The Colorimetric Determination of Phosphorus, J. Biol. Chem. **66**:375, 1925.

These findings indicate an increased response on the part of new-born infants to the ingestion of phosphate. According to Klercker and Odin,[37] who worked with rachitic infants, the minimum dose capable of affecting the serum calcium content of older infants is 80 mg. per kilogram of body weight. In their experiments, which extended over a four hour period, they gave two doses, each of 80 mg., at two hour inter-

TABLE 3.—*The Effect of the Oral Ingestion of Various Amounts of Inorganic Phosphate on the Calcium Content and the Phosphorus Content of the Serum of New-Born Infants*

	Weight at Birth, Gm.	Age, Days	Serum Calcium, Mg. per 100 Cc.		Serum Inorganic Phosphorus, Mg. per 100 Cc.		Extent of Fall in Serum Calcium, Mg. per 100 Cc.	Extent of Rise in Serum Phosphorus, Mg. per 100 Cc.
			Before	After	Before	After		
			Dose, 220 mg. per kilogram					
C.	.....	8	10.7	7.2	6.9	16.1	3.5	9.2
			Dose, 120 mg. per kilogram					
B.	3,800	5	9.3	7.3	5.6	18.9	2.0	13.3
D.	2,400	9	9.5	8.5	6.6	12.2	1.0	5.6
			Dose, 52 mg. per kilogram					
S.	2,800	3	10.1	8.5	6.7	12.6	1.6	5.9
P.	3,400	5	9.3	7.9	5.6	10.3	1.4	4.7
Dn.	3,900	3	10.2	9.1	6.1	13.9	1.1	7.8
H.	4,500	5	9.2	8.1	5.6	11.0	1.1	5.4
W.	3,600	7	10.3	9.3	7.0	13.2	1.0	6.2
Y.	3,500	4	9.8	9.1	6.5	9.6	0.7	3.1
Mean.	3,610	4.5	9.82	8.67	6.25	11.77	1.15	5.52
			Dose, 37 mg. per kilogram					
T.	3,200	7	9.9	8.3	7.5	11.9	1.6	4.4
M.	3,700	7	10.2	8.6	7.7	13.2	1.6	5.5
Q.	3,100	7	10.6	9.2	6.6	12.5	1.4	5.9
Sc.	3,300	7	10.4	9.0	6.8	11.7	1.4	4.9
O'N.	2,900	7	10.6	9.4	7.1	12.5	1.2	5.4
K.	2,800	7	10.2	9.3	7.7	12.7	0.9	5.0
G.	3,300	7	10.1	9.5	6.5	12.3	0.6	5.8
R.	3,300	9	10.0	9.7	7.2	14.3	0.3	7.1
Mean.	3,200	7.25	10.25	9.13	7.14	12.64	1.12	5.50
			Dose, 31 mg. per kilogram					
McC.	3,600	8	10.4	9.7	7.1	10.5	0.7	3.4
Ho.	3,300	9	10.3	9.7	6.8	11.4	0.6	4.6
Ca.	3,500	8	10.5	9.9	6.8	11.3	0.6	4.5
L.	3,100	8	10.5	10.0	6.7	10.2	0.5	3.5
Mean.	3,380	8.25	10.42	9.82	6.85	10.85	0.60	4.00

vals, making the total dose 160 mg. per kilogram, so that the reaction in new-born infants is even more striking than would at first appear from a comparison with their observations.

Relation to Deficiency of Vitamin D.—The only form of tetany known to occur in infants after the neonatal period is that due to a deficiency of vitamin D or of sunlight. That the new-born are nor-

37. Klercker, G. O., and Odin, M.: Zur Frage der Genese der sogenannten Phosphattetanie, Acta pædiat. **5**:79, 1925.

mally deficient in vitamin D is indicated by the studies of Hess and Weinstock [38] and Toverud and Ender,[39] who found little or no vitamin D in the livers of new-born infants. Disease due to a deficiency of vitamin D is rare in the new-born and has been observed only in the offspring of mothers with osteomalacia, by Maxwell [40] and by Wolfe.[41] Toverud assumed that the vitamin D content of the new-born infant's liver is dependent on the maternal diet, but there is no evidence to corroborate this assumption. The mothers of at least two of the new-born infants with tetany [11] received vitamin D supplements during a

TABLE 4.—*Effect of the Oral Ingestion of Inorganic Phosphate on the Calcium Content and the Inorganic Phosphorus Content of the Serum of New-Born Infants Who Received Viosterol*

	Weight at Birth, Kg.	Age, Days	Duration of Viosterol Therapy, Days—Dose, Drops	Serum Calcium, Mg. per 100 Cc.		Serum Inorganic Phosphorus, Mg. per 100 Cc.		Extent of Fall in Serum Calcium, Mg. per 100 Cc.	Extent of Rise in Serum Phosphorus, Mg. per 100 Cc.
				Before	After	Before	After		
Dose, 52 mg. per kilogram									
D.	3.5	9	8 × 30	10.3	7.4	8.0	17.0	2.9	9.0
M.	4.3	8	8 × 30	10.2	7.8	7.6	12.6	2.4	5.0
C.	2.9	9	8 × 30	10.6	9.0	7.5	12.6	1.6	5.1
G.	3.1	9	8 × 30	10.6	9.3	7.1	15.0	1.3	7.9
K.	3.4	7	7 × 30	9.9	8.6	8.9	13.2	1.3	4.3
Mo.	3.2	7	6 × 30	9.3	8.3	7.1	12.5	1.0	5.4
Ki.	3.5	7	6 × 30	10.2	9.7	6.0	10.3	0.5	4.3
T.	3.2	6	6 × 30	10.6	10.2	4.0	10.7	0.4	6.7
E.	3.8	9	7 × 30	10.0	9.8	6.9	14.1	0.2	7.2
J.	3.4	9	7 × 30	10.7	10.7	7.7	13.9	0.0	6.2
V.	3.5	9	7 × 30	9.4	9.6	6.5	12.5	—0.2	6.0
Mean	3.44	8.09	7.09 × 30	10.16	9.13	7.03	13.13	1.03	6.10
Dose, 37 mg. per kilogram									
Ca.	3.6	7	6 × 40	10.2	9.3	6.5	12.3	0.9	5.8
Ma.	3.0	9	8 × 40	10.7	9.8	6.1	11.2	0.9	5.1
W.	3.4	9	8 × 40	10.5	9.6	6.0	11.5	0.9	5.5
S.	3.7	8	8 × 40	10.3	9.5	7.8	10.5	0.8	2.7
Cas.	3.3	7	6 × 40	10.0	9.3	7.7	13.2	0.7	5.5
R.	2.9	7	6 × 40	9.4	8.7	6.2	11.7	0.7	5.5
May.	3.4	8	8 × 40	10.6	10.1	5.4	10.9	0.5	5.5
Tl.	3.4	7	6 × 40	10.1	9.7	6.0	10.6	0.4	4.6
Mean	3.46	7.75	7.00 × 40	10.23	9.50	6.46	11.50	0.73	5.04

considerable part of the pregnancy. Rohmer and Woringer,[28] Calvin and Borovsky [42] and later Klercker and Odin [37] pointed out that infants

38. Hess, A. F., and Weinstock, M.: An Investigation of the Prenatal Factor in the Susceptibility of Infants to Rickets, Am. J. Dis. Child. **36**:966 (Nov.) 1928.

39. Toverud, K. U., and Ender, F.: The Vitamin A and D Content of the Liver of New-Born Infants, Acta pædiat. **18**:174, 1936.

40. Maxwell, J. P.: Two Cases of Foetal Rickets, J. Path. & Bact. **33**:327, 1930.

41. Wolfe, J. J.: Teeth in Fetal Rickets, Am. J. Dis. Child. **49**:905 (April) 1935.

42. Calvin, J. K., and Borovsky, M. P.: Results Following the Administration of Alkali Phosphates to Spasmophilic Rachitic and Normal Infants, Am. J. Dis. Child. **23**:238 (March) 1922.

deficient in vitamin D are much more responsive to the administration of phosphate than are normal infants. In fact, it is extremely difficult to depress the serum calcium content of normal infants even with large amounts of phosphate administered orally.

In order that it might be determined whether the response of new-born infants to the ingestion of phosphate is dependent on a deficiency of vitamin D, viosterol was given to a series of new-born infants daily for from six to eight days, and their response to ingestion of phosphate was then tested. The results are shown in table 4.

The administration of vitamin D caused no striking difference in the reaction to the ingestion of phosphate. The doses of viosterol used (from 30 to 40 drops daily) may have been inadequate, but this seems hardly likely, since the amount used is generally sufficient to raise the serum calcium content of tetanic infants about 2 or 3 mg. per hundred cubic centimeters in seven days. However, the new-born infant may fail to absorb viosterol as well as the older infant.

COMMENT

Tetany in the new-born is a not infrequent condition. Though essentially similar in its clinical manifestations to tetany in older infants, it presents a number of unusual features. In contrast to the frequency of infantile tetany in Negro infants, there are no reports of tetany of the new-born in this racial group. Unusual, too, is the large number of cases in private patients, fully half of the reports being of such cases. Tetany in older infants is largely a social disease, being observed much more often in clinical practice.

A striking feature is the relatively large number of cases observed since 1933. Though tetany of the new-born had been previously described and fairly widely discussed, it is only within the past few years that cases have been observed with any frequency. There have been no reports of tetany of the new-born in the foreign literature since 1930. There are a number of papers on tetany during early life [43] and a review on tetany of the new-born,[44] but the youngest patient mentioned in the foreign literature was 15 days of age.[43c]

It seems most likely that tetany in the new-born is due to a temporary hypofunction of the parathyroid glands. As evidence for this theory are (1) the abrupt drop in the serum calcium content within a few hours after birth, (2) the small amount of phosphorus excreted

43. (*a*) Nassau, E.: Zur Klinik der manifesten Tetanie im Säuglingsalter, Ztschr. f. Kinderh. **28**:310, 1921. (*b*) Graham, S.: Aetiology of Convulsions in Early Infancy, Acta pædiat. **16**:572, 1933. (*c*) Gorter, E., and De Does, J. J.: La tétanie des enfants au dessous de trois mois, Rev. franç. de pédiat. **10**:709, 1934.

44. Zambrano, E.: La tetania nei neonati, Pediatria **42**:78, 1934.

in the urine and (3) the hyperresponsiveness to the ingestion of phosphate. A contributing factor is the endogenous release of phosphate during the physiologic starvation of the new-born.

Conditions which increase the breakdown of tissue (such as fever) or which prevent the ingestion of food (such as the failure of the infant to suck after a cerebral injury at birth) increase the amount of endogenous phosphorus released and thereby favor the occurrence of tetany.

The Rôle of Cow's Milk.—The tetanogenic effect of cow's milk on older infants has been known for a number of years and has been widely discussed, particularly in the German and the Scandinavian literature. Infantile tetany is much more common in artificially fed than in breast-fed infants. Finkelstein [45] has shown that an improvement in the electrical reactions can be induced in artificially fed infants with tetany solely by the withdrawal of milk and that the tetanic electrical reactions reappear on the reintroduction of cow's milk into the diet. He has also seen the symptoms and electrical reactions of tetany disappear when a tetanic infant is fed human milk instead of cow's milk.

This property of cow's milk has been attributed to its high content of phosphate. Cow's milk contains about six times as much phosphorus as does human milk. The high phosphorus content is only partly balanced by the high calcium content. Another difference between cow's milk and human milk which may have some significance is the higher lactose content of human milk. Lactose has been shown to favor the absorption of calcium.[46]

Within recent years cow's milk supplements, often in high concentration, have been widely used in America in the feeding of the new-born. The extra phosphorus ingested in this way may be an added factor in the pathogenesis of tetany of the new-born. It may account for the recent increase in cases, particularly in America, and for the more frequent occurrence of the condition in private patients, who are more likely than ward patients to receive the added attention of early supplementary feeding.

SUMMARY

The symptomatology and the treatment of tetany in the new-born are summarized.

Three mechanisms are considered as playing a part in the pathogenesis of tetany of the new-born: deficiency of vitamin D, parathyroid hypofunction and reactivity to phosphate.

45. Finkelstein, H.: Lehrbuch der Säuglingskrankheiten, Berlin, Julius Springer, 1924, p. 539.

46. Dragstedt, L. R., and Peacock, S. C.: The Control and Cure of Parathyroid Tetany by Diet, Am. J. Physiol. **64**:424, 1923.

Though the new-born infant has no appreciable reserve of vitamin D, the failure of vitamin D supplements to prevent the drop in the serum calcium content following the ingestion of phosphate is believed to be evidence against the point of view that this form of tetany is related to a deficiency of vitamin D.

The abrupt fall in the serum calcium content which occurs regularly within a few hours after birth, the low urinary phosphorus content and the marked response to the ingestion of phosphate are looked on as evidence of hypo-activity of the parathyroids in the new-born. It is suggested that this phenomenon is related to the maternal hyperactivity of the parathyroids during fetal life.

The endogenous release of phosphate during the physiologic starvation of the new-born contributes to the hypocalcemia.

The possibility that cow's milk, because of its high phosphorus content, may be a factor in the tetany of the new-born is suggested.

FAILURE OF ABUNDANT SUNSHINE TO PROTECT AGAINST RICKETS

C. ULYSSES MOORE, M.D.
AND
JESSIE LAIRD BRODIE, M.D.
PORTLAND, ORE.
AND
A. J. THORNTON, M.D.
ALEX M. LESEM, M.D.
AND
OLIVE B. CORDUA, M.D.
SAN DIEGO, CALIF.

Although during the past decade preventive measures have almost eliminated severe rickets, milder forms of this dyscrasia still persist. The desire to ascertain how prevalent rickets continues to be and, if possible, what its relationship is to climatic and certain other factors prompted the present fact-finding, cross-sectional survey. For this study two localities were chosen which differed markedly as to climate, one being in the cloudy northwestern part of the Pacific coast and the other in its sunny southwestern part, yet were of the same country and of the same altitude (sea level) and had inhabitants of similar habits of living and diet.

Portland had an average of 2,194 hours of sunshine per year, compared with 3,024 hours in San Diego—a difference of 38 per cent. In addition, for the years from 1930 to 1934 inclusive, the average annual temperature in Portland was 54.6 F., while that of San Diego was 62.1 F. During the three summer months, June, July and August, Portland's average temperature was 66.8 F. and San Diego's 63.3 F., while the average temperature during the winter for Portland was 45.3 F. and for San Diego was 55.7 F. These comparisons do not tell the whole story, however, for Portland has greater extremes both of temperature and of humidity than has San Diego. During the rainy

This study was made through the cooperation in Portland of the University of Oregon Medical School, the Oregon Parent-Teacher Association and the Portland Pediatric Society, and in San Diego of the City and County Health Bureau, especially the Public School Division, and of other physicians and of dentists in both cities. It was financed largely by a grant of funds from the Wisconsin Alumni Research Foundation.

winter season the sun may not appear for days at a time in Portland. Sunshine during the winter is usually the accompaniment of cold weather, with freezing or near freezing temperatures lasting at times for some weeks. For climatic reasons San Diego, with its sunny, mild climate in winter, would seem to offer far greater advantages in the prevention of rickets, if sunshine is as important as is often stated.

It was recognized at the outset of this study that for findings to be comparable uniform criteria must be adopted, including similar records (fig. 1) and examining technics. These were the more important since even the definition of rickets, like many other terms, is gradually changing as knowledge of the subject becomes more exact. We realized, too, that, while it does not take a physician to diagnose gross or marked rickets, in its milder forms [1] the formation of the bones may differ so slightly from that which is optimal as to require for differential diagnosis both laboratory aids and meticulous clinical examinations. It has been suggested that the bony stigmas of mild rickets be called suboptimal osseous development of nutritional origin. To unify examining technic, three of us (Drs. Thornton, Brodie and Moore) made together a preliminary check of a group of children.

For the complete survey here reported, children of a single age group were used, the so-called 5 year olds, or those who would enter the public schools the next year. This group was chosen because our study could be combined with the regular preschool examination, because these children had been born since antirachitic methods became popular and because at that age the stigmas of infantile rickets are still manifest. In Portland the children were brought in by the Parent-Teacher Association from fifty-one of the city's sixty-five grammar school districts. In San Diego the children came from nine of the thirty-six school districts. In both cities the children examined constituted a fairly representative cross-section of all social classes. Poverty was, consequently, not a determining factor.

The procedure followed in the two cities was similar. Each child was examined by two physicians, one making the usual general physical examination and another, a special examination of the osseous development. In order to minimize variations in judgment, two doctors, one from each city, made all the osseous examinations. These examinations were limited to the simpler practical points which can be determined in any physician's office. As only apparently well children were admitted and our time was limited, laboratory tests, such as those of basal metabolism for endocrine conditions, blood, urine, stools, etc., were omitted. Certain anamnestic data were carefully collected for later collation. Gradings on posture were made according to common

1. Moore, C. Ulysses, and Dennis, H. G.: Studies in Rickets, California & West. Med. **44**:288, 1936.

standards (fig. 2), and photographs were taken from anterior and lateral aspects.[2] Roentgenograms of the wrists were made to determine the osseous age of each child. The dental examinations were made by children's dentists.

Mother: Name _____ Address _____ Para _____

Child: Name _____ Sex _____

Race: _____ Nat'l _____ Complexion: Blonde _____ Red Headed _____ Brunette _____

Birth: Date _____ Weight _____ Length _____

No. Mos. Breast Fed _____

Antirachitics: Prenatal ____ Kind _____ Daily dose _____ Began at _____ Cont. to _____

_____

Postnatal ____ Kind _____ Daily dose _____ Began at _____ Cont. to _____

_____

Irradiated milk _____ Amt. daily _____ Duration _____

Examination: Date _____ Weight _____ Height _____

I. Head: 1. Shape: Symmetrical _____ Oval _____ Quadratic _____ Flat _____

2. Bosses: Parietal _____ Frontal _____

3. Nasal septum: Normal _____ Deviated _____

II. Mouth: 1. Palate _____ Normal _____ High _____ Narrow _____

2. Teeth: No. / · No. carious / : No. missing / ' No. Filled /

Malocclusion _____ Crowding _____ No. Abscesses / _____

III. Chest: 1. Symmetrical _____

2. Shape (at Xiphoid plane) _____

Pigeon breast _____

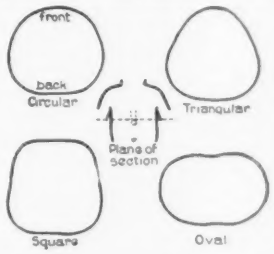
Funnel breast _____

3. Rosary _____

4. Groove _____

5. Flaring of costal margin _____

6. Costomalacia _____



IV. Posture _____ B L _____ K K _____ F F _____

V. Epiphyses (wrists) _____

VI. Muscle tone: _____

VII. Abdomen: Distention _____ Diastasis Recti _____

VIII. X-rays _____ Photo _____

Notes: √=Apparently normal Examined by _____

+, ++, +++, ++++ = Degrees abnormal or pathologic ($\pm$ = ½).

B L = Bowed Legs: K K = Knock knees: F F = Flat feet.

Head Flatness at Whorl of Hair: Record an area the size of a dollar as +: the size of palm of hand as ++.

Fig. 1.—Form used for examination in rachitic survey.

The Portland group consisted of 550 children, 541 of white and 9 of black, yellow or mixed blood. Race was, therefore, negligible. There

2. Moore, C. Ulysses: Posture: Standard for Anterior Posture, Am. J. Dis. Child. **47**:488 (March) 1934.

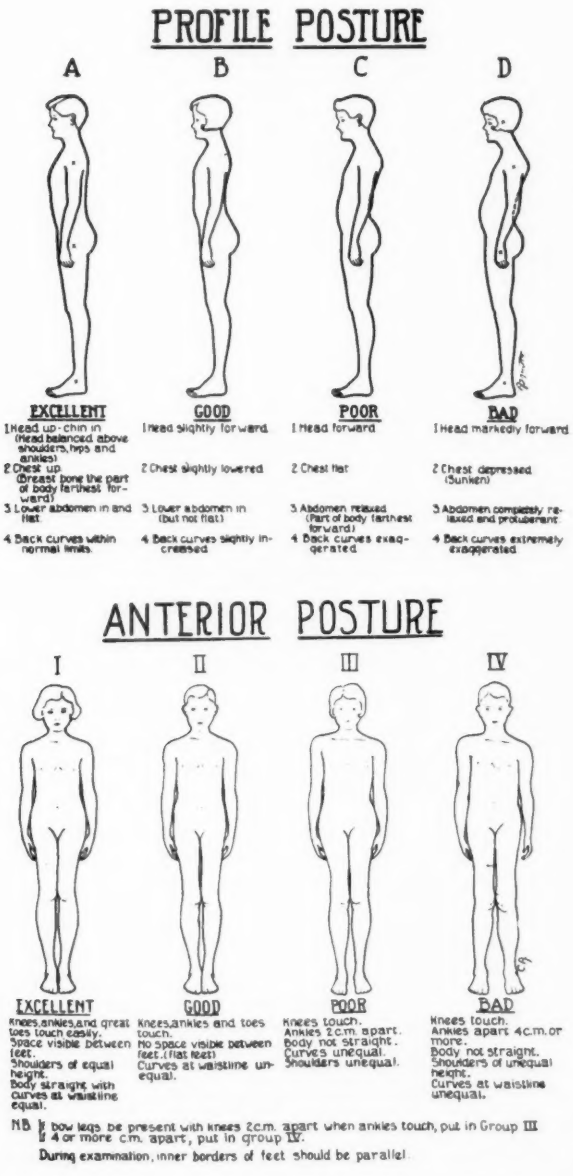

PROFILE POSTURE
A
B
C
D
EXCELLENT
1 Head up - chin in (Head balanced above shoulders, hips and ankles)
2 Chest up (Breast bone the part of body farthest forward)
3 Lower abdomen in and flat
4 Back curves within normal limits.
GOOD
1 Head slightly forward.
2 Chest slightly lowered.
3 Lower abdomen in (but not flat.)
4 Back curves slightly increased.
POOR
1 Head forward.
2 Chest flat.
3 Abdomen relaxed. (Part of body farthest forward.)
4 Back curves exaggerated.
BAD
1 Head markedly forward.
2 Chest depressed. (Sunken)
3 Abdomen completely relaxed and protuberant.
4 Back curves extremely exaggerated.
ANTERIOR POSTURE
I
II
III
IV
EXCELLENT
Knees, ankles, and great toes touch easily.
Space visible between feet.
Shoulders of equal height.
Body straight with curves at waistline equal.
GOOD
Knees, ankles and toes touch.
No space visible between feet. (Flat feet)
Curves at waistline unequal.
POOR
Knees touch.
Ankles 2 c.m. apart.
Body not straight.
Curves unequal.
Shoulders unequal.
BAD
Knees touch.
Ankles apart 4 c.m. or more.
Body not straight.
Shoulders of unequal height.
Curves at waistline unequal.
NB If bow legs be present with knees 2 c.m. apart when ankles touch, put in Group III
If 4 or more c.m. apart, put in group IV.
During examination, inner borders of feet should be parallel.

Fig. 2.—For a grade of A in lateral posture the external auditory meatus, the tip of the acromial process, the greater trochanter and the external malleolus fall in a perpendicular line. A grade of I in anterior posture requires that a perpendicular dropped from the nose shall fall through the suprasternal notch, the navel and an open space between the apposed feet. If the medial borders of the feet touch from the malleoli to the great toes, a grade of II is given.

were 321 of blonde, 3 of black and 202 of brunette coloring, and 18 were red haired. Data on 6 were not recorded. The sexes were represented in about even numbers, there being 272 boys and 278 girls. Of these children 317 were from 5 to 6 years of age; 171 were between 6 and 6½, 19 were less than 5, and the remaining 43 were slightly more than 6½. The average age was 5.62 years.

When divided according to race, the San Diego group of 393 children was found to comprise 360 of the white, 23 of the Negro, and 10 of the yellow race. The number of boys was 201 and of girls, 192. There were 199 of blonde, 160 of brunette and 23 of black complexion, while 11 were classified as red haired or of mixed type. Divided according to age, 329 were from 5 to 6 years old, 21 from 6 to 6½ and 43 of less than 5 years, the average age being 5.37 years.

TABLE 1.—*Weight at Birth and Duration of Maternal Feeding*

	Portland		San Diego	
	No.	%	No.	%
Weight at Birth				
Not known	64	....	31	....
6 pounds or under (2,722 Gm.)	64	13.1	45	12.4
From 6 to 10 pounds (2,721 to 4,536 Gm.)	413	85.1	303	83.7
Over 10 pounds (4,536 Gm.)	9	1.8	14	3.9
Total	550	100	393	100
Duration of Breast Feeding				
No data	45	....	94	....
Less than two weeks	76	15.0	1	0.3
Less than six months	155	30.8	128	42.8
From six to nine months	177	35.0	64	21.4
More than nine months	97	19.2	106	35.5
Total	550	100	393	100

The average weight at birth of the Portland children was 7.77 pounds (3,528 Gm.), and of the San Diego children, 8.65 pounds (3,927 Gm). The average duration of maternal feeding of children of the former group was 6.29 months and of those of the latter, 7.36 months.

The anamnestic data obtained were utilized to determine, as far as possible, the comparative weights at birth and the early nutrition of the children of these two groups (table 1). For the Portland group the average weight at birth was 7.77 pounds (3,528 Gm.); for the San Diego group, 8.65 pounds (3,927 Gm.). According to statements of the mothers obtained at the time of each child's examination, the average time during which these children were fed by breast was for Portland six and twenty-nine hundredths months and for San Diego seven and thirty-six hundredths months. What advantageous effects the heavier weight at birth and the longer maternal feeding may have had on the bones and teeth of the San Diego group we are not prepared to state. They may mean more than we can estimate or at present appreciate.

The consumption of some form of antirachitic preparation by these children was common, although the amount and the regularity varied

markedly—an inherent characteristic of the administration of medicines. Of the Portland children, so their mothers stated, only 93, or 17 per cent, had received no antirachitic preparation, and of the San Diego group, only 70, or 18 per cent. A more detailed study is being prepared of this phase of the survey. Present data indicate that no significant positive correlation exists between the consumption of antirachitic preparations and the frequency of signs of rickets.

A summary of eight common osseous signs of rickets, as found in the two groups, is presented in table 2. It is noteworthy that of Portland's group, 95 per cent exhibited four or more of these eight signs of rickets, as compared with 73 per cent of San Diego's. If only three of these eight signs were considered necessary for a diagnosis of rickets, the percentages would be: Portland, 98, and San Diego, 91.8. An

TABLE 2.—*Osseous Signs of Rickets in Children of Preschool Age in the Two Climates Studied*

	Average Annual Sunshine, Hr.	Children Studied, No.	Head		Chest		Extremities				Those with 4 or More of These 8 Signs	
			Flatness	Bossing	Pigeon or Funnel	Rosary	Groove or Costal Flare	Enlarged Epiphyses	Genu Valgum or Varum	Flatfoot	No.	%
Portland	2,194	550	512	364	242	405	409	413	415	407	523	95
San Diego	3,024	393	338	270	269	228	311	203	185	199	287	73

These clinical findings varied in degree from + to ++++ (±, i. e. less than 1, not counted). It is noteworthy that a high percentage of the children in sunny southern California, as well as of those in cloudy western Oregon, have several signs of suboptimal osseous development.

analysis of table 2 reveals the greatest variations to be in the findings in regard to the lower extremities. It appears probable that a portion of this difference may be due to a difference in the examining technic, especially as to the grading for genu valgum, genu varum and flatfoot.

Two photographs, one anterior and one lateral view, were made of each child. As the work progressed it was found advisable to take a third photograph, an anterior view of the legs and feet only, with the feet parallel and the internal malleoli and the great toes touching. Had this been done from the beginning, probably little, if any, discrepancy in grading would have occurred. In cases of genu valgum the knees had, of course, to be lapped over, as in figure 3, to determine the degree of flatfoot. In the illustration, when the boy's knees are thus overlapped not only do the internal malleoli touch, but the flattened longitudinal arches permit the navicular bones to touch and eliminate the normally open space extending from the internal malleoli to the bases of the great toes. From this photograph alone a flatfoot grade of d or 4 plus is easily ascertained. Since the boy's lateral view shows the abdomen to extend slightly farther forward than the chest, giving a grade of B or perhaps B —, and since the anterior view shows the internal malleoli

to be more than 4 cm. apart when the knees are touching normally, giving a grade of IV, one can, from these three photographs, ascertain with a fair degree of accuracy that his total grade for posture will be B, IV, d.

If, therefore, the legs and feet are omitted from the comparison of the children in the two cities and it is considered that for a diagnosis of mild rachitis or suboptimal osseous development three of the remaining six signs (flatness of the head, bossing, deformity of the chest, rosary, Harrison's groove and enlarged epiphyses) are required, then the percentage would be: Portland, 98 and San Diego, 91. We believe

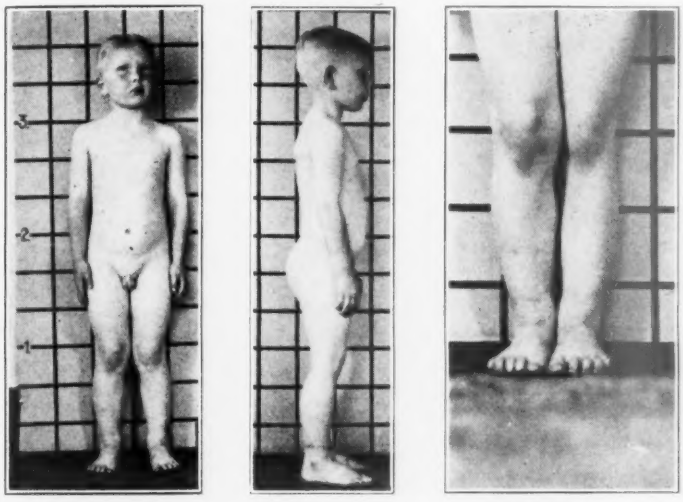


Fig. 3.—Illustration of the type of photographs taken, the background composed of 4 inch squares being used for determining the grades in anterior and lateral posture and the degree of flatfoot found. This child's grades are B, IV and d.

this to be the most accurate comparison. This difference of 7 per cent in frequency of mild rickets can hardly be considered significant.

The high percentage of incidence of the stigmas of rickets—over 90 per cent in both cities—suggests that present customs of clothing, housing and diet tend to modify the antirachitic value of sunshine and of the medicinal antirachitic preparations commonly consumed.

The study of posture from both lateral and anterior aspects reveals that in both cities the largest number of children fall into the C and III groups (table 3). A grade of A for lateral posture was obtained by only 3 children in Portland and by 21 of the San Diego group; a grade of I for anterior posture was received by 38, or 7 per cent, of the former group and by 60, or 15 per cent, of the latter.

Roentgenograms were made of the distal portions of the radii and of the carpal bones of both wrists, and 194 of these were taken at

random for more careful study, including search for evidence of inadequate calcification, endocrine disturbances and allergy. The technic in determining the epiphysial index and certain other findings will be presented in a separate paper. Great variability was revealed between the osseous and chronological ages of these children (table 4) and between the number of visible centers of ossification in the two wrists of the same child. Differences of one or two bones between the two hands were common, and 1 child in the group had three carpals visible

TABLE 3.—*Grades on Posture in Children of Preschool Age (550 from Portland and 393 from San Diego)*

	Lateral		Anterior		Flatness of Feet	
City	Grade	No.	Grade	No.	Degree	No.
Portland	A	3	I	38	a	132
San Diego		21		60		228
Portland	B	120	II	170	b	229
San Diego		148		154		56
Portland	C	381	III	292	c	111
San Diego		187		152		88
Portland	D	46	IV	50	d	78
San Diego		37		27		21

The posture, therefore, most commonly found was C—III, or far below the optimal.

TABLE 4.—*Osseous Ages of 5 Year Old Children*

		Carpal Centers Visible											Averages		
		2		3		4		5		6		7			
	Children	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Carpals No.	Age, Yr.	Osseous Age
Portland	112	3	2.7	10	9.0	22	19.6	11	9.8	13	11.6	53	47.3	5.61	5.50	....
San Diego	82	1	1.2	11	13.4	19	23.1	8	9.8	14	17.1	29	35.3	5.34	5.21	....
Totals	194	4	2.1	21	10.8	41	21.1	19	9.8	27	13.9	82	42.3	5.49	5.37	5.40

Wide variations between chronological and osseous ages are revealed. Less than 10 per cent showed agreement, 42 per cent having an osseous age of 7 years and 34 per cent less than 5 years.

in one wrist and six in the other. The average chronological age of the 194 was 5.37 years, that of the Portland children being 5.5 and that of the San Diego children, 5.21. The average osseous age of the entire group was 5.49, with 4 children having only two centers visible and 21 children only three.

It has been said [3] that the osseous age, as measured by the number of carpal centers visible roentgenographically, agrees in general with the chronological age. As shown in table 5, such agreement occurred

3. (*a*) Pryor and Puyhaubert, cited by Abt, J. A.: Pediatrics, Philadelphia, W. B. Saunders Company, 1923, vol. 1, p. 286. (*b*) Engelbach, William: Endocrine Medicine, Springfield, Ill., Charles C. Thomas, Publisher, 1932, vol. 2, p. 56.

in only 9.8 per cent of the 194 children studied. Although the averages show that the osseous age was only 0.12 years greater than the chronological age, a breakdown of the figures gives the osseous ages of 42 per cent as 7 years and of 34 per cent as 4 years or less. Forty of the 53 Portland children with seven carpals were actually but 5 years of age, and one of these was only 4½. Some 2 per cent of these

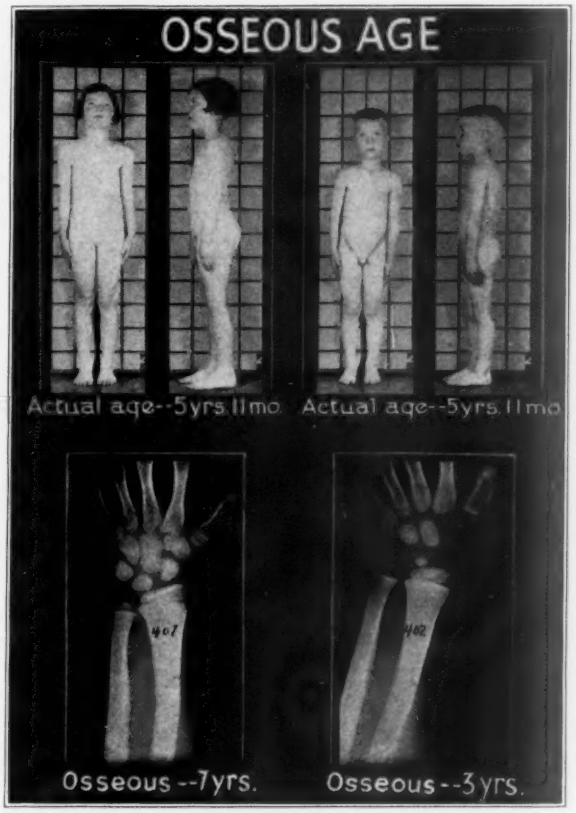


Fig. 4.—Photographs and roentgenograms of 2 children whose chronological ages are equal. A difference of at least 4 years in osseous age is apparent.

194 5 year olds had but two centers. This seems the more remarkable when it is remembered that many infants have two carpals present at birth.

Among the 5 year olds there were wide individual variations. A typical example (fig. 4) is that of a Portland boy and girl, each 5 years and 11 months of age. The girl had seven well ossified centers and the boy only three. The boy's weight at birth was 6 pounds and 10 ounces (3,010 Gm.) and the girl's, 6 pounds (2,700 Gm.) The boy

apparently had had better care and feeding, but at the time of examination he was 44 inches (112 cm.) tall, compared to the girl's 48 inches (122 cm.). His weight was 44 pounds (97 Kg.) and hers, 58 pounds (127 Kg.). Thyroid therapy, of course, is indicated.

DENTAL DATA

Of the several items of comparison, the dental findings show the greatest degree of variance between the children of these two cities (table 5). Of the San Diego children, 54.5 per cent possessed excellent teeth with no cavities or fillings, compared with 22.4 per cent among the Portland children. Ten of the Portland children had caries in

TABLE 5.—*Dental Data on 943 Children*

	Children			
	Portland		San Diego	
	No.	%	No.	%
I. Cariousness				
Excellent—no cavities or fillings	123	22.4	214	54.5
1 to 4 carious teeth	130		75	
5 to 9 carious teeth	162		63	
10 to 15 carious teeth	101	77.6	25	45.5
Over 15 but not all teeth	24		16	
All teeth carious	10		0	
II. Malocclusion	61	11.1	109	27.5
III. Filled	95	17.3	25	6.3
IV. Abscessed teeth	23	4.2	61	15.5

The percentage of caries-free teeth in the San Diego children was two and one-half times as great as that in the Portland children.

every tooth, while not a single one of the California group was so afflicted. Since the other osseous findings were fairly comparable for the two groups, this difference in dental data raises again the question of the etiology of caries. An analysis of the mineral content of the supplies of water of the two cities shows that the city water of San Diego contains several times as much calcium, magnesium, sodium and other minerals as that of Portland. Portland dentists have long decried the lack of minerals in their local supply of water as a contributing factor in dental caries. Indian folk-lore has it that the tribes occupying the Wilamette valley had notoriously poor teeth. The examination of recruits for the army and the navy during the last quarter of a century has marked the men of the northwestern part of the Pacific coast as having worse teeth than those of any other section of the United States.[4] Our findings indicate that this difference is manifest even among children of preschool age.

4. Anderson, W. M.: Physical Unfitness, Northwest Med. **25**:28, 1926. (See also current government reports.)

MATHEMATICAL STUDY

A mathematical study was made to determine the correlation of certain signs of rickets to each other and to dental caries (fig. 5). The variability of the graphs in the different sections may be due partly to the component elements, based on clinical findings which in turn depend on human judgment instead of on a more accurate yardstick. Tetrachoric coefficients of correlation [5] were obtained (Thurstone's method) for fifteen factors. Since the "probable error of a tetrachoric coefficient is large," definite statements regarding individual correlations can hardly be made. A general inspection of the graph, however, shows

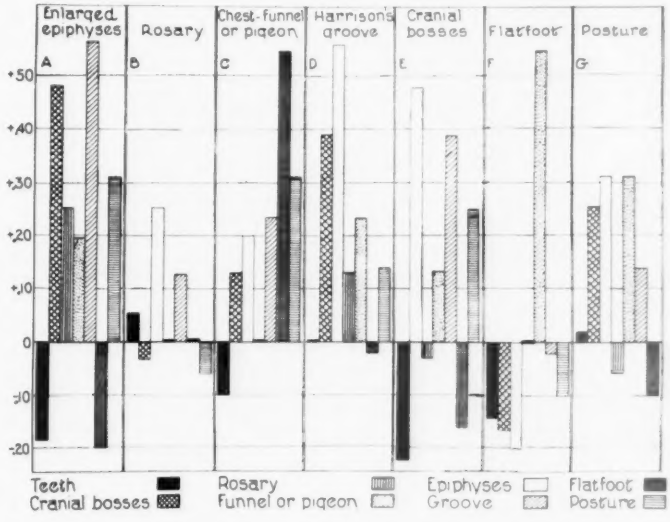


Fig. 5.—Graphic representation of the frequencies obtained, showing that the signs of rickets have a significant positive correlation to each other and a negative correlation to caries.

that the correlations between cariousness of teeth and certain common signs of rickets are consistently negative or else approach zero, whereas correlations among the signs of rickets themselves are generally positive and greater numerically. Correlations in addition to those given were determined, but these gave corroborative evidence only and were therefore omitted for brevity's sake. The assumption that cariousness of teeth is a sign of rickets is shown by these findings to be open to question.

5. Thurstone, L. L.: A Simplified Multiple Factor Method, Ann Arbor, Mich., Edward Brothers, Inc., 1934. Chesire, Leone; Saffir, Milton, and Thurstone, L. L.: Computing Diagrams for the Tetrachoric Correlation Coefficient, Chicago, University of Chicago Press, 1933. Kelley, Truman L.: Statistical Method, New York, The Macmillan Company, 1924.

An analysis of section *A* of figure 5, in which enlarged epiphyses are used as the basis of comparison, shows a negative correlation of epiphyses to teeth (— 0.18) and of epiphyses to flatfoot (— 0.20) but a positive correlation of epiphyses to Harrison's groove (+ 0.55), to bossing of the head (+ 0.48), etc. It may be noted that the algebraic sum of the figures regarding flatfoot in the two sections is above the zero line (+ 0.38), while that regarding teeth is well below that line.

To determine mathematically the relation of common signs of rickets to posture, posture was used as the base in section *G*. Here, too, a positive correlation, confirming clinical data, is found.

Section C, based on such deformities of the chest as pigeon breast and funnel breast, shows a positive correlation (+ 0.55) to posture. Since deformities of chest and back, including dorsum rotundum, are easily obtained in experimental animals fed a diet productive of rickets, one would look for the same deformities in rachitic human beings. Hence, the positive correlation found to exist between deformities of the chest and suboptimal posture in children adds mathematical proof of a relationship between rickets in animals and in man.

SUMMARY

This comparative clinical study covers 943 5 year old children in two meteorologically different localities.

More than 90 per cent of these children exhibited three or more signs of rickets.

Maternal statements indicate that some 80 per cent of the children in each city had received medicinal antirachitic treatment.

Among the children of sunny San Diego the percentage of rickets was nearly as great as among those of cloudy Portland.

In this study wide variations were found between the chronological ages and the osseous ages.

The teeth of the San Diego children were much better as regards caries than those of Portland, the numerical relation being as 57 to 22.

A mathematical study of the relationship between the osseous signs of rickets used in this study shows a positive correlation.

A negative correlation was found between carious teeth and rickets.

CONCLUSION

From these data it appears: (1) that under modern living conditions abundant sunshine does not furnish adequate protection against rickets and (2) that the universal adoption of some inexpensive dietetic antirachitic preparation is desirable.

Dr. Martha Eliot assisted with the roentgenograms, and Dr. Elizabeth Montgomery and Dr. Beatrice Aitcheson of the University of Oregon assisted with statistical correlations.

ROENTGEN STUDIES OF CHILDREN WITH ALIMENTARY DISTURBANCES DUE TO FOOD ALLERGY

JOSEPH H. FRIES, M.D.
AND
JUDAH ZIZMOR, M.D.
BROOKLYN

There are comparatively few reports in the literature dealing with roentgenographic visualization of the allergic gastro-intestinal tract.

In 1915 Crispin [1] observed roentgenologically in a patient suffering from hematemesis and intermittent abdominal pain a transient lesion at the pylorus; this lesion was found at operation to be due to angioneurotic edema. In 1917 Christian [2] reported on two patients with abdominal pain simulating acute conditions requiring surgical intervention. Roentgen studies of one patient revealed pylorospasm, slow gastric emptying and atonic loops of small intestine, and studies of the other showed a transient sausage-like shadow produced by a narrowed distal loop of ileum. In 1921 Duke [3] observed an increase in the number and in the depth of peristaltic waves in the stomach and an increase in gastric tonicity during an attack of abdominal pain caused by sensitivity to rice. In 1927 Eyermann [4] studied roentgenologically a patient sensitive to wheat, after deliberate feeding of this food, and observed hypertonicity in the transverse and pelvic colon and hypotonicity in the cecum and ascending colon. In 1928 Vaughan [5] demonstrated a markedly spastic transverse colon in a food-sensitive patient. In 1931 Rowe [6] attributed colonic spasm, hyperperistalsis and other irregularities to sensitiveness of the intestinal tract to foods. He advised the use of allergen-free mixtures of barium sulfate in the routine examination of

From the Department of Applied Immunology and Radiology, Jewish Hospital.
Read at the spring meeting of the Department of Applied Immunology, Jewish Hospital, April 14, 1937.

1. Crispin, E. L.: Visceral Crises in Angioneurotic Edema, Collected Papers of the Mayo Clinic, Philadelphia, W. B. Saunders Company, 1915, vol. 7, p. 823.

2. Christian, H. A.: Visceral Disturbances in Patients with Cutaneous Lesions of the Erythema Group, J. A. M. A. **69**:325 (Aug. 4) 1917.

3. Duke, W. W.: Food Allergy as a Cause of Abdominal Pain, Arch. Int. Med. **28**:151 (Aug.) 1921.

4. Eyermann, C. H.: X-Ray Demonstration of Colonic Reaction in Food Allergy, J. Missouri M. A. **24**:129 (April) 1927.

5. Vaughan, W. T.: Allergic Factor in Mucous Colitis, South M. J. **21**:894 (Nov.) 1928.

6. Rowe, A. H.: Food Allergy, Philadelphia, Lea & Febiger, 1931.

patients with gastro-intestinal allergy. In 1932 Serio [7] observed roentgenographically in two patients gastro-intestinal disturbances following the oral administration of foods to which they were sensitive. These observations were controlled by comparative roentgen studies of a normal and an allergic person who were given these allergenic foods mixed with barium. In 1933 Rowe [8] reported gastro-intestinal studies of four allergic patients made after administration of barium sulfate mixtures containing specific allergens; he noted gastric retention, hypermotility and colonic spasm. In 1934 Andresen [9] concluded that food allergy could be suspected when certain characteristic disturbances in gastro-intestinal motility were noted. In 1936 extreme spasm and a hazy shadow of local edema in the transverse colon were observed by Gay [10] in a patient reacting abnormally to pork.

All of these previous studies were made on adults, and the allergens were administered orally. The present study deals with roentgenographic observations of the gastro-intestinal tract in children after the deliberate oral administration of the allergenic foods and in some instances after rectal administration also.

The patients were selected from the pediatric section of the allergy clinic. Those were chosen who demonstrated repeatedly a definite gastro-intestinal disturbance following the ingestion of a specific food. The study of each patient included taking of a detailed history, a physical examination, cutaneous tests, trial feedings and eliminations and later deliberate feedings of allergenic foods.

Comparative roentgenographic studies were made, first with an ordinary barium sulfate meal and at a later date with a barium meal containing the specific food to which the patient was sensitive. Roentgen studies consisted of fluoroscopic examinations and roentgenograms taken immediately after the barium meal and at three, six, twenty-four and forty-eight hours thereafter. The barium meal consisted of 125 cc. of barium sulfate, 4 Gm. of acacia, a small amount of sucrose for sweetening and enough water to bring the total amout to 250 cc. This mixture was given to each patient for the control study, which was made when the patient was free from symptoms. For the comparative study the specific offending allergen was added to the barium mixture. Enough allergen was given to produce gastro-intestinal disturbances;

7. Serio, F.: La sintomatologia radiologica della anafilassi gastro-intestinale, Riforma med. **48**:1742 (Nov. 12) 1932.

8. Rowe, A. H.: Roentgen Studies of Patients with Gastro-Intestinal Food Allergy, J. A. M. A. **100**:394 (Feb. 11) 1933.

9. Andresen, A. F. R.: Gastro-Intestinal Manifestations of Food Allergy, J. M. Sc. New Jersey **31**:402 (July) 1934.

10. Gay, L. P.: Radiological Demonstration of an Allergic Reaction in the Mucosa and Musculature of the Colon, Am. J. Digest. Dis. & Nutrition **3**:181 (May) 1936.

the amount had been determined by previous clinical trials. About one week was allowed to elapse between the control study and that concerned with the allergen. Most of the patients were studied additionally by means of barium enemas. The control enema was made with barium sulfate suspended in water, while in the comparative study the specific food was mixed with the barium sulfate. To obviate any nervous or psychic factor in these studies, the allergen was added to the barium mixture without the knowledge of the patient.

Twelve patients were studied by oral and rectal administration of the allergens. Six were sensitive to egg, two to milk, one to nuts, one to oats, one to wheat and one to corn.

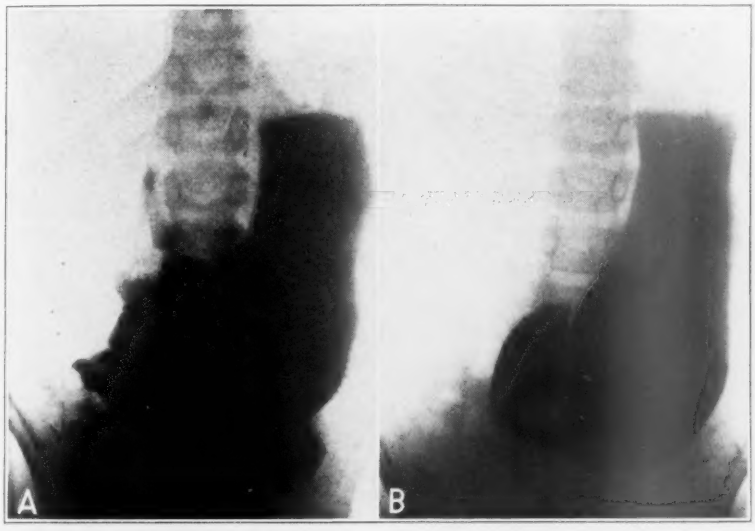


Fig. 1 (case 1).—*A,* immediate study made without the allergen, showing the free passage of barium from the stomach into the small intestine. *B,* immediate study made with the allergen (nut), showing hypomotility and gastric retention.

For the sake of brevity, only one case will be described in detail. The findings for the remaining patients in our series will be described briefly, and only the more pronounced features will be reported.

REPORT OF CASES

CASE 1.—L. S. was a 6 year old boy. He had a family history of allergy and had been subject to attacks of asthma since the age of 4 years. His mother noted that he disliked all types of nuts and that the ingestion of any nut was followed by nausea, vomiting, epigastric distress and abdominal pain. Intradermal tests elicited markedly positive reactions to almond, walnut and brazil nut. Deliberate feeding of nuts on several occasions produced nausea, vomiting and abdominal discomfort.

The initial examination was done with an ordinary barium mixture free from the allergen.

Combined fluoroscopic and roentgenographic study revealed a normal esophagus and a J-shaped stomach with normal rugae, curvatures, tone and peristalsis. The pylorus was not spastic, and the duodenal bulb filled well. The barium left the stomach readily.

An immediate film revealed barium in the duodenum and jejunum.

A six hour plate revealed a gastric retention of about one sixth of the barium. The bulk of the barium was in the terminal ileum and in the ascending colon, extending as far as the hepatic flexure. There was evidence of barium in the small intestine.

After twenty-four hours the large bowel was empty except for traces of barium in the appendix and rectum.

Fig. 2 (case 1).—*A*, six hour study made without the allergen, showing slight gastric retention. *B*, six hour study made with the allergen (nut), showing severe gastric retention.

After forty-eight hours no barium could be visualized in the intestinal tract.

A barium enema without allergen revealed normal filling of the rectum and colon.

Several days later a second examination was made, after the patient had ingested 2 teaspoonfuls of a nut mixture (almond, walnut and brazil nut) in a barium meal. Combined fluoroscopic and roentgenographic study at this time revealed the following picture: The esophagus was normal. The stomach was hypotonic, and its motility was definitely diminished. The rugae and curvatures revealed no organic defect. The barium failed to fill out the pylorus, and practically no barium left the stomach. The duodenal bulb was narrow; it filled with difficulty. During this part of the examination, the patient complained of severe pain about the middle of the abdomen and vomited a small portion of his meal.

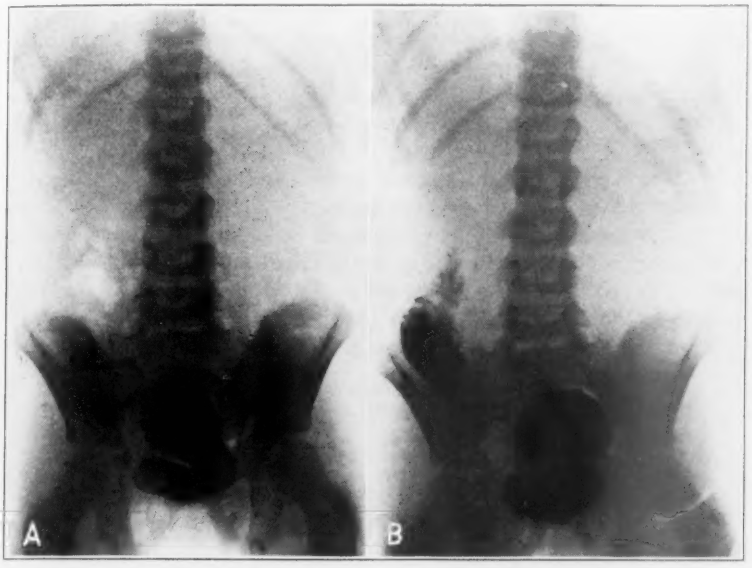


Fig. 3 (case 1).—*A*, twenty-four hour study made without the allergen, showing traces of barium in the appendix, sigmoid and rectum. *B*, twenty-four hour study made with the allergen (nut), showing moderate amount of barium in the appendix, cecum and rectum.

Fig. 4 (case 1).—*A*, barium enema study made without the allergen, showing normal filling of the colon. *B*, study made with the allergen (nut), showing spasm of the transverse colon.

After six hours approximately two thirds of the barium was still retained in the stomach. Some barium was distributed throughout the small intestine. The cecum and the appendix were partially filled.

After twenty-four hours the appendix was filled with barium. There was a slight amount of barium in the cecum. There was considerable residue in the rectum.

After forty-eight hours the entire intestinal tract was empty except for a scant residue which visualized the appendix and cecum.

In a subsequent study a barium enema containing 2 teaspoons of the nut mixture was introduced. Combined fluoroscopic and roentgenographic examination revealed immediate and persistent extreme narrowing of the transverse colon. At this time the patient complained of severe generalized cramplike abdominal pain.

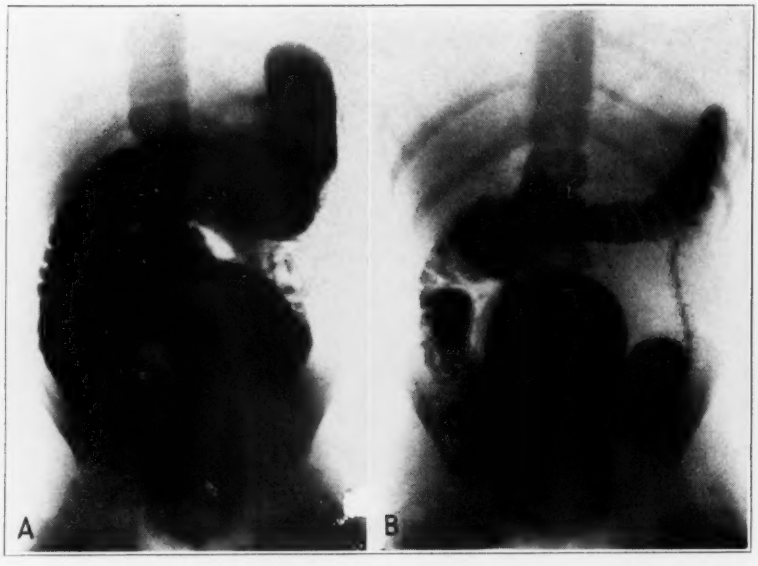


Fig. 5 (case 2).—*A,* barium enema study made without the allergen, showing normal filling of the colon. *B,* study made with the allergen (egg), showing spasm of the descending colon.

Twenty minutes after administration of the barium enema which contained the allergen, a constitutional reaction developed. This consisted of cyanosis, dyspnea, faintness, rapid pulse, congestion of the conjunctivae and generalized urticaria with intense pruritus. A hypodermic injection of 5 minims (0.31 cc.) of a solution of epinephrine hydrochloride relieved the patient of his severe symptoms.

Summary.—A gastric test meal containing a nut mixture produced marked gastric retention. An enema of barium with added nut mixture produced abdominal pain and persistent spasm of the transverse colon. A constitutional reaction occurred shortly after the introduction of this enema.

CASE 2.—G. T., a boy aged 8 years, had bronchial asthma. Ingestion of egg had always induced nausea and vomiting.

Intradermal tests with egg (0.01 mg. of nitrogen per cubic centimeter) were positive (+). Two thirds of a raw egg was used for the gastric test meal and one egg for the barium enema.

Combined fluoroscopic and roentgenographic observations with both control and allergenic test meals revealed no objective abnormalities in the immediate, six, twenty-four and forty-eight hour studies. No subjective abnormalities were noted.

Combined fluoroscopic and roentgenographic study of the large bowel after introduction of the control enema revealed normal filling. There were no associated subjective disturbances. One week later a barium enema containing one raw egg was introduced. Complete filling of the entire colon occurred, followed immediately by marked spasm of the descending colon. During this spasm the patient complained of periumbilical pain and tenesmus.

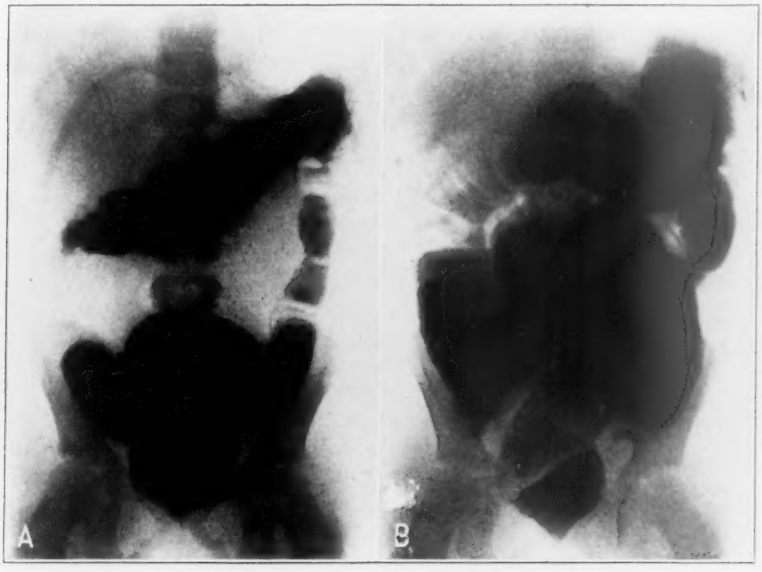


Fig. 6 (case 3).—*A*, barium enema study made without the allergen, showing normal filling of the colon. *B*, study made with the allergen (milk), showing generalized distention of the colon.

Case 3.—A. DeM., a boy aged 7 years, had angioneurotic edema. The ingestion of milk induced abdominal pain, nausea, vomiting and diarrhea.

Intradermal tests with a 1:10 dilution of milk were negative. Four ounces (114 cc.) of raw milk was used for the gastric test meal and for the barium enema.

The ordinary gastric test meal revealed no unusual findings except hypermotility, which was evidenced by the presence of barium throughout the entire colon after six hours. The studies done with a barium enema gave normal findings.

Reexamination with a barium meal containing the allergen revealed the following reactions: The stomach failed to empty for a period of fifteen minutes, despite the occurrence of peristaltic waves. During this time the patient complained of supra-umbilical pain. The roentgenograms taken immediately afterward revealed normal findings.

After six hours the bulk of the barium was loculated in the ileum.

The twenty-four and forty-eight hour studies were essentially normal findings.

The enema containing the allergen revealed rapid filling of the entire colon, which appeared to be extremely atonic. Shortly after administration of this enema the patient complained of tenesmus and epigastric distress. A roentgenogram revealed a markedly hypotonic colon, which was distended throughout its entire length.

CASE 4.—A. K., a 7 year old boy, had asthma and hay fever. Ingestion of egg induced nausea and vomiting.

Intradermal tests with egg (0.01 mg. of nitrogen per cubic centimeter) were positive (+). One half of a raw egg was used for the gastric test meal and for the barium enema.

Fluoroscopic and roentgenographic study with the ordinary barium meal revealed normal findings, except that hypermotility was evidenced by the presence of barium in the rectum after six hours.

Combined fluoroscopic and roentgenographic examination after ingestion of the allergen revealed a transient hour-glass deformity of the stomach, absence of peristalsis and a fifteen minute delay in emptying of the stomach. An immediate roentgenogram disclosed incomplete filling of the duodenal bulb. Practically no barium was observed in the small intestine.

One-half hour after ingestion of this test meal the patient had intense cramp-like pain in the epigastrium; this pain persisted for about one hour.

After six hours a trace of barium was still evident in the stomach.

After twenty-four hours barium outlined the entire large bowel. The transverse and descending portions of the colon were spastic, as evidenced by narrowed haustra and deep sulci.

After forty-eight hours the entire large bowel was outlined by barium.

The control barium enema revealed normal filling and outlines.

An enema containing the allergen revealed rapid filling of the entire bowel, followed by spasm of the transverse and ascending colon. The patient complained concomitantly of intense midabdominal pain.

CASE 5.—R. K., a boy aged 8 years, had bronchial asthma. Oatmeal caused nausea.

Intradermal tests with a 1:10 dilution of oatmeal were positive (+). One ounce (28 Gm.) of cooked oatmeal was used for the gastric test meal and for the barium enema.

Combined fluoroscopic and roentgenographic study with the control meal revealed normal findings throughout.

Fluoroscopic examination with the allergen revealed a transient hour-glass deformity of the stomach, decreased motility and delayed gastric emptying. The patient complained of nausea.

After six hours a few dilated loops of jejunum were visualized.

The twenty-four and forty-eight hour studies gave essentially negative results.

An ordinary barium enema showed normal filling.

After the administration of a barium enema containing oatmeal, severe spasm of the ascending and transverse colon was noted. The patient at this time complained of abdominal pain and tenesmus.

CASE 6.—B. S., a boy aged 14 years, had urticaria and mucous colitis. The ingestion of corn induced diarrhea, tenesmus and mucous stools.

Intradermal tests with corn (0.05 mg. of nitrogen per cubic centimeter) were positive (+++). Two ounces (57 Gm.) of sweet corn was used for the gastric test meal.

A combined fluoroscopic and roentgenographic examination was made with the gastric test meal. No objective or subjective abnormalities were noted in the immediate or three, six and twenty-four hour studies.

The test meal containing the allergen revealed the following reactions: The stomach was hypotonic. Its motility was definitely diminished. The duodenal cap was incompletely filled. Almost no barium left the stomach for one-half hour. The patient complained of nausea during this time.

After six hours about half of the barium was still present in the stomach. Numerous dilated loops of jejunum and ileum were visible. The colon was outlined as far as the hepatic flexure. The transverse colon was greatly narrowed.

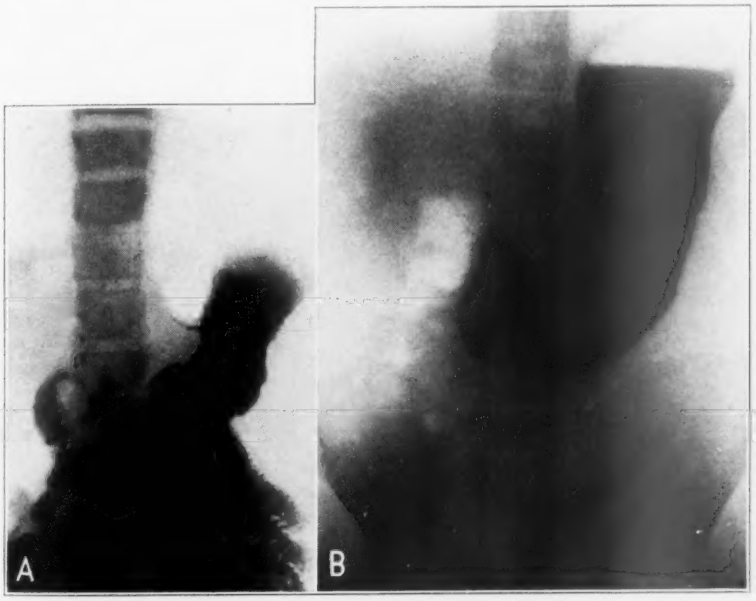


Fig. 7 (case 6).—*A,* immediate study made without the allergen, showing normal motility and emptying. *B,* immediate study made with the allergen (corn), showing hypomotility and gastric retention.

After twenty-four hours the colon was well outlined with barium except where there was extreme narrowing of the distal half of the transverse colon and of the entire descending colon.

No studies were made by means of a barium enema.

Case 7.—R. L., a girl aged 11 years, had bronchial asthma. Ingestion of egg caused vomiting and nausea.

Intradermal tests with egg (0.01 mg. of nitrogen per cubic centimeter) were positive (++++). Two thirds of an egg was used for the gastric test meal and for the barium enema.

The ordinary gastric test meal revealed no unusual findings.

Reexamination on two subsequent occasions with a barium meal containing the allergen gave these results: The stomach was hypotonic and hypomotile. There was a definite delay in the passage of barium through the pylorus. The duodenal bulb was incompletely filled. Little barium could be seen in the duodenum and jejunum.

After six hours one sixth of the barium meal still remained in the stomach. Barium outlined the terminal ileum and the colon as far as the splenic flexure.

After twenty-four hours the large bowel and the rectum were well outlined.

After forty-eight hours the transverse colon appeared spastic, with narrowed haustra and deep sulci. The appendix and the rectum were still outlined by barium.

Comparative studies with a control barium enema and one containing the allergen gave normal findings.

Fig. 8 (case 6).—*A*, six hour study made with the allergen (corn), showing gastric retention; dilated loops of small intestine and linear narrowing of the transverse colon. *B*, twenty-four hour study made with the allergen (corn), showing severe narrowing of the distal half of the transverse colon and of the descending colon.

CASE 8.—I. S., a boy aged 12 years, had bronchial asthma. Since infancy ingestion of egg had caused nausea and vomiting.

Intradermal tests with egg (0.01 mg. of nitrogen per cubic centimeter) were positive (+). One raw egg was used for the gastric test meal, and for the barium enema.

In the immediate studies of the stomach and small intestine made with the control and the allergen meal, hypomotility of the stomach and a delay in the passage of the barium into the small intestine were observed.

After six hours one sixth of the normal barium meal was retained in the stomach, whereas one half of the barium was retained when the allergen was present.

After twenty-four hours no important differences were noted.

After forty-eight hours barium outlined the entire large bowel in the allergen study only.

Studies made by means of barium enemas gave negative results, except that transient left lower quadrant pain followed the administration of the enema containing the allergen.

CASE 9.—J. C., a girl aged 5 years, had chronic atopic neurodermatitis. Ingestion of egg induced nausea and vomiting.

Intradermal tests with egg (0.01 mg. of nitrogen per cubic centimeter) were positive (++). One raw egg was used for the gastric test meal and for the barium enema.

Fluoroscopic and roentgenographic study with the ordinary barium meal revealed normal findings on immediate examination.

At six hours one sixth of the barium remained in the stomach. The barium had progressed to the hepatic flexure.

The twenty-four and forty-eight hour studies gave essentially negative results.

After the ingestion of the barium meal containing the allergen, the passage of barium from the stomach was delayed for more than ten minutes, despite an increase in gastric peristalsis.

After six hours one third of the test meal was retained in the stomach. Barium was found in the terminal ileum and in the large bowel as far as the sigmoid flexure.

After twenty-four and forty-eight hours the findings were normal.

Studies made with barium enema showed no significant variations from the normal.

CASE 10.—R. E., a boy aged 12 years, had bronchial asthma and migraine. Ingestion of egg was followed by midabdominal pain, nausea, belching and abdominal distress.

Intradermal tests with egg (0.01 of nitrogen per cubic centimeter) were positive (++). One raw egg was used for the gastric test meal and for the barium enema.

The ordinary gastric test meal revealed no unusual findings.

Reexamination with a barium meal containing the allergen revealed the following reactions: The stomach was hypotonic. There was marked diminution in the motility of the stomach. By fluoroscopic examination almost no barium was seen to pass through the stomach during a period of twenty minutes. The pylorus was narrowed and the duodenal bulb was filled with difficulty. During this part of the examination the patient complained of nausea.

After six hours one sixth of the barium meal was contained in the stomach. Considerable amounts of barium were distributed throughout the jejunum and ileum.

After twenty-four hours the transverse colon was spastic, as revealed by increased haustral markings. The barium had progressed to the rectum.

After forty-eight hours there was a generalized accentuation of the haustral markings throughout the large bowel.

Administration of an ordinary barium enema showed normal filling and outlines.

The introduction of the allergen-containing enema was followed by a transient spasm of the descending colon, and later by a more persistent spasm of the transverse colon. Immediately after a small quantity of barium had been introduced, the patient complained of a sensation of fulness in the abdomen.

CASE 11.—D. LeP., a boy aged 4 years, had bronchial asthma. Ingestion of wheat had always induced nausea and vomiting.

Intradermal tests with wheat (0.05 mg. of nitrogen per cubic centimeter) were positive (+). One teaspoonful of cooked farina was used for the gastric test meal and for the barium enema.

Studies with an allergen-free gastric test meal and barium enema gave essentially negative results.

On reexamination the allergen was added to the barium mixture. The findings were as follows: There was diminished motility of the stomach. Practically no barium passed through the pylorus during a period of twenty minutes. The duodenal bulb was narrow. The patient complained of nausea and vomited part of the meal at this time.

The immediate roentgenograms revealed dilated loops of small intestine.

After six hours most of the barium was in the ileum. A small amount of barium had reached the hepatic flexure, which appeared narrow.

After twenty-four hours there was evidence of spasm in the descending and the sigmoid colon.

After forty-eight hours residues were noted in the cecum, the descending colon and the rectum.

Comparative studies with the two types of barium enema revealed no differences.

CASE 12.—M. V., a girl aged 9 years, had urticaria. Ingestion of milk caused abdominal pain and nausea.

Intradermal tests with a 1:10 dilution of milk were negative. One ounce (28 cc.) of milk was used for the gastric test meal.

Studies with an ordinary gastric test meal showed essentially negative findings,

The gastric test meal containing the allergen revealed distinct hypotonia and hypomotility of the stomach, and a delay of more than ten minutes in the passage of barium from the stomach. The duodenal bulb was well visualized. Only small dabs of barium were noted in the duodenum and jejunum.

After six hours about one sixth of the barium was retained in the stomach. Barium filled the terminal ileum. There was evidence of colonic hypermotility, as the entire colon was outlined from cecum to rectum. The transverse and the descending colon appeared spastic, as evidenced by narrowed haustra and deep sulci.

After twenty-four hours there were no unusual findings.

Studies with a barium enema were not made.

COMMENT

There were marked variations in the disturbances in the gastro-intestinal tract produced by allergenic foods, as visualized roentgenographically. The disturbances varied in type and intensity.

The patients studied were selected because they exhibited pronounced gastro-intestinal disturbances on the ingestion of particular foods. In making studies with such persons, the possibility of a constitutional reaction following oral, and particularly rectal, administration of the offending foods must be considered. With improvement in technic it may be possible in the future to avoid untoward reactions. With further study it may also be possible to demonstrate the effects of aller-

genic foods which produce less marked gastro-intestinal disturbances. That such procedures may eventually offer an additional diagnostic method for use in cases of allergy is a possibility which merits further consideration and study.

Cutaneous reactions produced by the scratch and intradermal methods were slight in some of our cases, even though the allergy to food had been proved clinically. In some patients small wheals with a surrounding erythema were obtained. The patients who manifested severe gastro-intestinal symptoms after ingesting specific foods apparently had more clearly positive skin reactions, such as a large wheal with pseudopod formation and a surrounding zone of erythema. It is interesting that in case 1 an intradermal test with almond (0.005 mg. of nitrogen per cubic centimeter) induced faintness and severe abdominal pain.

SUMMARY AND CONCLUSIONS

Peristaltic disturbances in various parts of the gastro-intestinal tract following the feeding of allergenic foods have been visualized roentgenographically in allergic children.

These disturbances may manifest themselves as gastric retention, increased or decreased motility of the gastro-intestinal tract and spasm or dilatation of the stomach or intestines.

Subjective complaints referable to the gastro-intestinal tract usually accompanied the objective findings.

485 Ocean Avenue.

4611 Fourteenth Avenue.

INFECTIOUS DIARRHEA IN THE NEW-BORN CAUSED BY AN UNCLASSIFIED SPECIES OF SALMONELLA

BEATRICE McKINLAY, A.B.
WICHITA, KAN.

Recent reports from hospitals of infectious diarrhea in the new-born present a baffling bacteriologic picture. Barenberg, Levy and Grand [1] reported four epidemics of this type of infection which occurred within a year in hospitals of New York city and the near vicinity. The mortality averaged around 50 per cent. In none of these epidemics could one be sure of the causative agent.

Dulaney and Michelson [2] reported a succession of cases of diarrhea in the new-born at the Memphis General Hospital in which 47 per cent of the patients died. In this epidemic 67 per cent of the babies had stools containing Bacterium coli-mutabile. It may be recalled that the interesting characteristic of this organism is its similarity to the Salmonella, or paratyphoid, group. The organism when first isolated appears to be a true member of the Salmonella family. Dissociation then occurs if the culture is made on a medium containing lactose, and characteristics of Bacillus coli appear.

Fothergill [3] reported the observation of "atypical paratyphoid" bacilli in the stools of 65.4 per cent of a group of infants with summer diarrhea. The group included older as well as new-born infants. The organisms isolated all showed variations which distinguished them from the accepted types of the Salmonella group. One consistent difference was the lack of motility in all of the types isolated.

The cases of infectious diarrhea in the new-born which I wish to report occurred in July 1935 at the Wesley Hospital. The mortality was 33 per cent. Four babies became ill on the same day with severe diarrhea and fever, their temperatures ranging from 101 to 104 F.

From the Wesley Hospital.

1. Barenberg, L. H.; Levy, W., and Grand, M. J. H.: Epidemic of Infectious Diarrhea in the New-Born, J. A. M. A. **106**:1256-1260 (April 11) 1936.

2. Dulaney, A. D., and Michelson, I. D.: A Study of B. Coli Mutabile from an Outbreak of Diarrhea in the New-Born, Am. J. Pub. Health **25**:1241-1251 (Nov.) 1935.

3. Fothergill, Leroy D.: Unusual Types of Non-Lactose Fermenting, Gram-Negative Bacilli from Acute Diarrhea in Infants, J. Infect. Dis. **45**:393-403 (Nov.) 1929.

Stools were plated at once on Endo's medium. All cultures showed a heavy growth of nonlactose-fermenting organisms. Immediate transfer was made of typical colonies to differential sugar mediums. Uniform results were obtained in the four sugars dextrose, lactose, sucrose and mannitol. Acid and gas were produced in dextrose and mannitol and none in lactose and sucrose; this reaction is an essential characteristic of the Salmonella group. Typhoid-agglutinating serum clumped the bacteria in a dilution of 1:80. Paratyphoid A serum in a dilution of 1:20 gave fairly well marked agglutination. There was no agglutination with paratyphoid B serum.

Salmonella was looked on at once as the possible causative agent. If this were correct, the babies must have been infected by mouth; therefore, a study of all possible sources of infection was instituted immediately. No two babies were receiving the same diet. Two were on formulas of prepared food, one was on cow's milk and one was breast fed. This source of contamination could be ruled out, although cultures of the prepared food were made. No organism corresponding to the one isolated from the stools was obtained.

Within the next two days two more babies became ill, presenting the same clinical picture.

The question of a carrier was next investigated. It is of interest that at this time a number of employees and nurses about the hospital were experiencing slight attacks of diarrhea.

It was found that only four nurses were coming in close contact with the babies; it was an easy matter to make cultures of their stools. It was found that one of them was excreting enormous numbers of nonlactose-fermenting organisms. Endo plates showed practically no colonies with the usual appearance of B. coli. Immediate transfer was made of typical colonies to the four sugars dextrose, lactose, sucrose and mannitol. Acid and gas were produced in dextrose and mannitol and not in lactose and sucrose, a reaction which was characteristic of the babies' cultures. On the strength of these observations this nurse was removed from the nursery.

Meanwhile the feeding of the well babies had been put in the hands of two nurses who were not allowed to come in contact in any other way with the babies. The sick babies had of course been isolated. Extreme care was observed in the feeding of the noninfected babies, and no more cases developed.

Two of the babies died, and permission for autopsy was obtained in each case. Complete bacteriologic work was not done in the first case, material for cultures being taken only from the mucosa of the small intestine. From these cultures, the same paratyphoid-like organism which had been obtained from the stools was isolated.

At the second autopsy, complete preparations were made for bacteriologic work. Cultures were made from the heart's blood, the spleen, the gallbladder, the liver and the small intestine. Mediums that would favor the growth of streptococci and staphylococci as well as mediums for the colon-typhoid group were used. Also, direct smears were made from the pus in the pericardial cavity. These smears showed numerous gram-negative bacilli. The cultures were striking. The Endo plates made from the heart's blood, the pericardial effusion, the spleen, the liver and the gallbladder had identical growths of a nonlactose-fermenting organism. The cultures made in dextrose-brain broth showed no other organism, so it was certain that pathogenic cocci were not present.

It was now possible for one to begin an intensive study of the organisms which had been isolated. A parallel study of the organism isolated from the heart blood of the baby being examined post mortem and the organisms isolated from the stools of two babies who had recovered was made.

In order to make the work as worth while as possible, all the cultures were incubated for three weeks. When there was any doubt about the production of acid and gas in the carbohydrates the work was repeated until satisfactory results were obtained. The following carbohydrates were used: arabinose, dulcitol, inositol, raffinose, rhamnose, sorbitol, trehalose, xylose, maltose, salicin, levulose, glycerol and galactose as well as the common sugars, dextrose, lactose, sucrose and mannitol. The two mediums were used which are now depended on to bring out essential characteristics—citrate agar and tartrate agar.

Some interesting information was obtained after a few months' study. It was observed that the organism obtained from the heart blood of baby H. at autopsy was similar in every detail to the organism obtained from the stools of baby S. and baby P., two of the babies who had recovered. A detailed study of the stools of each of the babies was not made, but there is no reason to believe that any other organism was involved in the epidemic, since bacteria were isolated from all the stools which had the characteristic reaction of the paratyphoid group on the sugars dextrose, lactose, sucrose and mannitol.

It was observed, also, that the organism which had been isolated could not be made to fit exactly into any definite type of the Salmonella group. Its general characteristics continued to place it in that group; that is, lactose and sucrose were not fermented while dextrose and mannitol showed marked fermentation, with the production of acid and gas. Motility was marked.

Confusing characteristics, however, appeared at this point, as is apparent from the table. The reaction with tartrate medium placed the organism as either Salmonella paratyphi or Salmonella Schottmülleri.

but it could not be classified as S. paratyphi because of the reaction with xylose and could not be classified as S. Schottmülleri because of the reaction with inositol. It is possible to follow through with the table and rule out each of the so-called types of the Salmonella group in this way.

The agglutination reactions also remained inconclusive. Typhoid serum continued to agglutinate the organism in a dilution as high as 1:80. Some agglutination was obtained in a 1:20 dilution of S. paratyphi serum. No agglutination could be obtained with any other member of the Salmonella group.

When it was seen how difficult an exact classification of the organism was, the culture obtained at autopsy was sent to the labora-

Fermentation Reactions of Cultures (AG Indicates Acid and Gas, and a Minus Sign, Negative)*

	Dextrose	Lactose	Sucrose	Mannitol	Dulcitol	Rhamnose	Sorbitol	Xylose	Raffinose	Arabinose	Trehalose	Inositol	Salicin	Levulose	Galactose	Glycerol	Maltose
Baby H.	AG	—	—	AG	AG	AG	AG	AG	—	AG	AG	—	—	AG	AG	—	AG
Baby S.	AG	—	—	AG	AG	AG	AG	AG	—	AG	AG	—	—	AG	AG	—	AG
Baby P.	AG	—	—	AG	AG	AG	AG	AG	—	AG	AG	—	—	AG	AG	—	AG

Motility and Reactions with Special Mediums

	Motility	Milk	Lead Acetate	Tartrate Agar	Citrate Agar	Gelatin	Indole
Baby H.	+	Alkaline	+	Alkaline	Growth	—	—
Baby S.	+	Alkaline	+	Alkaline	Growth	—	—
Baby P.	+	Alkaline	+	Alkaline	Growth	—	—

* The culture in the case of baby H. was obtained from the heart blood at autopsy; that in the case of baby S. and of baby P. was obtained from the stools.

tory of the United States Public Health Service in Washington, D. C. A part of the reply follows:

The culture which we received from you has been of great interest. The cultural characteristics are almost identical with those of atypical Bacillus paratyphosus A, or the Sendai strain of Aoki. We procured several strains of this organism from the Lister Institute. Antiserums against the organism which you sent to us and against one Sendai strain were prepared. By a series of agglutination tests we found that your organism was not Salmonella Sendai. Subsequently, we compared your organism serologically with all the major and some of the minor subgroups of the Salmonella group, but as yet we have not been able to identify it with any organism. The group is large, and other strains have an antigenic structure similar to that of the Sendai strain, but we do not have them in our collection as yet.

It seems apparent from our experience and the experience of others that the bacteriologic study of infectious diarrhea in the new-born presents a special problem. It is evident that the new-born are non-

resistant to organisms which are of little or no virulence to the adult. It is well known that there are many variations from the usual charted types of the colon-typhoid group. Organisms of little or no virulence are constantly appearing to confuse the worker. Apparently these constantly observed types, which cause little or no trouble in the adult population, are disastrous when the nonresistant new-born become the host. It seems probable that the infection in the new-born which I have just described had its origin in the adults who had mild diarrhea.

SUMMARY

An epidemic of infectious diarrhea in the new-born which was evidently caused by one organism is described.

This organism has the general characteristics of the Salmonella group of bacteria.

It does not correspond with any of the strains of the Salmonella group which one commonly sees described.

It seems probable that a carrier nurse was the cause of the epidemic.

GIRDLE TYPE ADIPOSITY AMONG MENTALLY DEFICIENT MALES

A. O. HECKER, M.D.
AND
V. C. WARREN, M.D.
POLK, PA.

In a survey of the entire male population of the Polk State School for Mental Defectives, 12 of 1,608 patients were found to exhibit girdle type adiposity. The survey was initiated because we had been impressed by the occurrence in certain mentally deficient males of girdle type adiposity associated with various other stigmas commonly observed with two recognized clinical syndromes, namely, the Laurence-Moon-Biedl syndrome and the Fröhlich syndrome. Three questions arose which served to fix our attention on this investigation: 1. Are these two syndromes related or distinct? 2. Are they actual clinical entities or merely anatomic and physiologic manifestations of disease produced by many and varying etiologic factors? 3. Should the two syndromes continue to occupy a place in medical literature as clinical entities?

The following cases are presented not as proof of any theory but as a stimulus to further investigation of these problems. In the discussion we shall attempt to offer evidence gathered from the literature on the status of these syndromes and to correlate it, if possible, with what we found in our own cases.

REPORT OF CASES

CASE 1.—G. L., a white boy aged 15 years, was admitted to the institution at the request of his father because of obvious mental retardation. Birth was at full term, and it was spontaneous after a twenty-four hour labor. The weight at birth was 9 pounds (4,082 Gm.). The child was breast fed for thirteen months. He walked at the age of 11 months but did not talk until the age of 5 years. He had convulsions at 3 months and at 1 year but none after that. He had pertussis and pneumonia at 2 years, diphtheria at 3 and measles and chickenpox at 5. His mental peculiarity was first noticed at the age of 1 year because he failed to develop as other children and because of a "glassy look in his eyes."

The family history showed four living and two dead siblings. Of the four siblings, one was apparently normal and one was mentally deficient and microcephalic, exhibiting night blindness; one is reported on in case 2. The father was below par mentally, and the mother had undergone roentgen treatment for sterilization. One of the deceased siblings died at the age of 3 weeks and the other at the age of 6 months of enteritis.

Examination revealed that the boy was 5 feet and 1 inch (155 cm.) in height and weighed 133 pounds (60.3 Kg.). There was typical adiposogenital dystrophy, as manifested by prominence of fat over the thighs, mons pubis, nates, abdomen and breasts and by definitely underdeveloped genitals. The pubic hair was of characteristic feminine distribution. The fingers were short and stubby, the ankles and wrists were relatively slender and the two middle toes on each foot were partially webbed. Ophthalmologic examination revealed internal strabismus, horizontal nystagmus and unusually severe hyperopia, which was probably a congenital defect.

A Binet-Simon test showed an intelligence quotient of 31, which placed the boy in the imbecile group.

CASE 2.—E. L., a brother of G. L. (case 1), aged 14, was admitted at the request of his father because of obvious mental retardation. He was born at full term spontaneously after a three day labor. The weight at birth was 11 pounds (4,989 Gm). The child was breast fed until he was 13 months old. He walked at the age of 1 year and talked at 2 years. He had chickenpox at 1 year, measles at 1 year and pneumonia at 6 and at 9 years. Mental peculiarity was first noticed when he was 3 years old, because of a "glassy look in his eyes" and obvious failure to develop normally.

The family history is recorded in the report on case 1.

Examination revealed that the boy was 4 feet and 7 inches (139.7 cm.) in height and weighed 81 pounds (36.7 Kg.). He showed typical adiposogenital dystrophy, as manifested by prominence of fat over thighs, mons pubis, nates, abdomen and breasts. Genu valgus was prominent. There was definite hypogenitalism, with one testis undescended and the other undersized. The pubic hair was scanty and feminine in distribution. The fingers were short and stubby. Mild microcephaly with prominent auricles was present. This boy showed, in his behavior at the school, definite evidence of night blindness. He died suddenly during an emergency tracheotomy for bilateral peritonsillar abscess, before an examination of the eyegrounds could be made.

A Binet-Simon test showed a mental age of 5 years and 2 months, with an intelligence quotient of 42, placing him in the imbecile group.

CASE 3.—C. B., a white boy aged 11 years, was admitted to the institution at the request of a social worker because of an obvious mental retardation. His birth had been at full term; it was spontaneous and uncomplicated. No other early history was obtainable.

The family history revealed the mother to be feebleminded; she had been institutionalized because of an active psychosis superimposed on her mental deficiency. The father was a middle grade moron and alcoholic. The six siblings showed mental retardation, but none manifested any optic, skeletal or glandular irregularities.

Examination showed that the boy was 4 feet and 2 inches (127 cm.) in height and weighed 63 pounds (28.6 Kg.). There was typical adiposogenital dystrophy, with prominence of fat over the thighs, mons pubis, nates, abdomen and breasts and definite hypodevelopment of the genitals. Both testes were undescended. There was no pubic or axillary hair. The fingers were short and stubby and the wrists and ankles slender. The middle toes of both feet were slightly webbed. Ophthalmologic examination revealed alternating internal strabismus, bilateral coloboma of the iris and tortuosity of the retinal vessels, which was marked on the left.

The Binet-Simon test gave an intelligence quotient of 53, placing the patient in the low grade moron group.

CASE 4.—D. M., a white boy aged 9 years, was admitted to the institution at the request of his father because of apparent mental retardation. The birth was precipitate and at full term. The child first walked at the age of 2 years and talked at 3. From the age of 2 years he presented a constant behavior problem. His peculiarities developed after severe convulsions during an attack of influenza when he was 2 years old.

The family history revealed that the father, the mother and the four siblings exhibited normal or superior mentality. Both the paternal and the maternal grandfather died of tuberculosis. The family history revealed no endocrine disturbances.

Examination showed that the boy was 4 feet and 9 inches (144.8 cm.) in height and weighed 96 pounds (43.5 Kg.). There was typical and marked adiposogenital dystrophy, as manifested by the prominence of fat over the thighs, nates, mons pubis, abdomen and breasts. The penis was markedly hypodeveloped, as

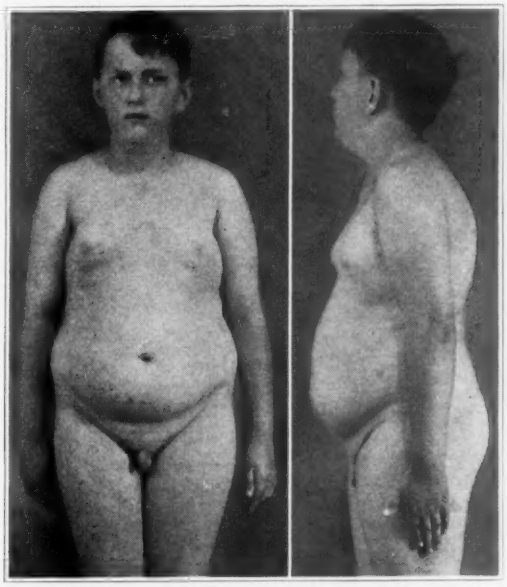


Fig. 1 (case 4).—Photograph of D. M.

were the testes. Pubic and axillary hair were completely lacking. Ophthalmologic examination showed a feeble and unsustained pupillary reflex action to light and moderate pallor of both disks, which were suggestive of postneuritic atrophy.

A Binet-Simon test showed an intelligence quotient of 77, placing the boy in the borderline group.

CASE 5.—C. B., a white boy aged 11 years, was admitted at his father's request because of obvious mental retardation. The birth was at full term and the delivery precipitate. The weight at birth was 7 pounds (3,175 Gm.). At birth the boy had bilateral clubfoot and apparently paralysis of the throat and tongue, which made feeding difficult; the latter condition lasted until he was 3 months of age. He seemed almost inert for six months and then began to show slow development. He sat up at the age of 1 year, crawled at 3 years and walked at 5. He had been able to learn only a few words.

The family history showed that the father and mother were apparently normal in all respects. A brother and sister, aged 14 and 5 years, respectively, were normal. The history of the ascendants and the relations was not significant.

Examination showed that the boy was 4 feet and 11½ inches (151.2 cm.) in height and weighed 123 pounds (55.8 Kg.). Fat was prominent around the hips, abdomen, breasts and thighs. The genital development was apparently normal. There were marked asymmetry of the face and paresis of the left side of the face. Ophthalmologic examination revealed feeble and poorly sustained pupillary reflexes. The eyegrounds were normal.

A Binet-Simon test gave a mental age below 3 years, placing the child in the low imbecile group.

CASE 6.—H. K., a white boy aged 12 years, was admitted at the request of his father because of obvious mental retardation. Data on the type of birth and the early history were not available.

Fig. 2 (case 6).—The patient shows typical Fröhlich features.

The family history revealed that the mother had dementia praecox and was institutionalized. The paternal history was unknown. There was one sibling, of whom no history was obtainable.

Examination showed that the boy was 4 feet and 9 inches (144.8 cm.) in height and weighed 109 pounds (49.4 Gm.). Typical adiposogenital dystrophy was associated with clear, delicate skin and full, curved, feminine facies. There was marked hypogenitalism, with undescended testes and complete lack of axillary and pubic hair. Ophthalmologic examination revealed slight horizontal nystagmus. The fundi were normal.

A Binet-Simon test showed an intelligence quotient of 58, placing the child in the moron group.

CASE 7.—G. W., a white boy aged 13, was admitted at his mother's request because of obvious mental retardation. He was born at full term, with a spon-

taneous and uncomplicated delivery. The mental and the physical development were normal until he was 3 years of age, when he had an attack of meningitis with convulsions. From that time he was definitely defective mentally.

The family history showed the mother, father and siblings to be normal. One sibling died at the age of 7 months of marasmus.

Examination showed that the boy was 4 feet and 9½ inches (146 cm.) in height and weighed 110 pounds (49.9 Kg.) Typical adiposogenital dystrophy was present; the penis was markedly underdeveloped and both testes were undescended. There was complete lack of pubic and axillary hair. The head was somewhat macrocephalic. There was left spastic hemiplegia. The fingers, wrists and ankles were tapering. Ophthalmologic examination showed only a choroidal ring around the left optic disk.

Fig. 3 (case 7).—In addition to cardinal manifestations of the syndrome, the patient shows spastic paralysis of the left arm.

A Binet-Simon test gave an intelligence quotient of 41, placing the boy in the imbecile group.

CASE 8.—C. T., a white boy aged 16 years, was admitted at his father's request because of obvious mental underdevelopment. He was born at full term after a difficult and complicated labor with a possible injury (as stated by the attending physician). He did not walk until he was 4 years old or talk until he was 7. His first teeth erupted when he was 21 months old. He had pneumonia at the age of 18 months and measles and mumps at the age of 6 years.

The family history showed that the father and mother and two siblings were apparently normal and that a maternal uncle was in an institution for the treatment of mental diseases.

Examination showed that the boy was 5 feet and 7 inches (170 cm.) tall and weighed 183 pounds (83 Kg.). There was marked adiposity, the fat being

distributed chiefly over the thighs, abdomen and breasts. There was no underdevelopment of the genitals, but the pubic hair showed typical feminine distribution. Ophthalmologic examination revealed nothing significant, although there was an almost constant bilateral squinting tic.

A Binet-Simon test gave an intelligence quotient of 24, placing the boy in the imbecile group.

CASE 9.—P. K., a white boy aged 15 years, was admitted at the request of a probation officer because of obvious mental deficiency. He was born at full term, with a difficult forceps delivery, and was probably injured at birth (attending physician's statement). He first walked and talked when he was about 2 years old.

The family history revealed that the mother was feebleminded and was reported to have weighed 500 pounds (227 Kg.) at the time of her death. A maternal aunt was said to have weighed 700 pounds (317 Kg.). The father was in a state institution for persons with mental disease. There were no siblings.

Examination showed that the boy was 4 feet and 8 inches (142 cm.) in height and weighed 92 pounds (41.7 Kg.). There were typical adiposogenital dystrophy and complete lack of pubic and axillary hair. Ophthalmologic examination showed the vision to be 20/100 in the left eye and 20/50 in the right. There were left internal strabismus and mild ocular nystagmus.

A Binet-Simon test gave an intelligence quotient of 53, placing the boy in the low grade moron group.

CASE 10.—S. B., a white boy aged 13 years, was admitted at the mother's request because of obvious mental retardation. It was stated that the birth was premature, but the duration of gestation was not known. He first walked at the age of 2 years and never learned to talk distinctly. The mother stated that he had an acute illness at the age of 3 months, but the nature of this illness could not be ascertained.

The family history was unknown. There were five siblings and two of these were thought to be mentally deficient.

Examination showed that the boy was 4 feet and 10 inches (147 cm.) in height and weighed 118 pounds (53.5 Kg.). He was extremely obese, with wide hips and abnormal accumulations of fat around the hips, thighs, mons pubis and breasts. The ankles were edematous. The penis was small, and the testes were undescended. There was complete lack of pubic and axillary hair. Ophthalmologic examination showed dilatation of the retinal veins suggestive of some increase in intracranial pressure, past or present.

A Binet-Simon test gave an intelligence quotient of 25, placing him in the low grade imbecile group.

CASE 11.—L. N., a white boy aged 13 years, was admitted at his father's request because of obvious mental deficiency. The history of his birth was unknown. He first walked at the age of 15 months and talked at 4½ years.

The family history was unknown.

Examination showed that the boy was 4 feet and 8 inches tall and weighed 93 pounds (42.2 Kg.). He presented a peculiar distribution of fat. There was an excessive accumulation over the hips, mons pubis and breasts, but the thighs were slender in proportion and of masculine contour. There was marked hypodevelopment of the genitals, and the testes were undescended. There was complete lack of pubic and axillary hair. Ophthalmologic examination revealed no significant findings.

A Binet-Simon test showed an intelligence quotient of 52, placing the boy in the low grade moron group.

CASE 12.—D. H., a white man aged 28 years, was admitted because of obvious mental deficiency. No history as to his birth, infancy, development or family was available.

Examination showed that he was 5 feet (152 cm.) in height and weighed 99 pounds (44.9 Kg.). He had typical adiposogenital dystrophy, as manifested by girdle type adiposity and extremely small genitalia. The pubic hair was fine and scanty. The fingers were long and tapering. The ankles and wrists were thin and delicate. Ophthalmologic examination showed advanced bilateral phthisis bulbi.

A Hayes-Binet test gave an intelligence quotient of 46, placing the man in the high grade imbecile group.

DESCRIPTION OF THE LAWRENCE-MOON-BIEDL SYNDROME AND FRÖHLICH'S SYNDROME

The Laurence-Moon-Biedl syndrome is not a common one. Reilly and Lisser [1] were able to collect seventy-seven cases from the literature, and since their article was published other cases have been reported, principally those of Cockayne, Krestin and Sorsby [2] (six cases), Jenkins and Poncher [3] (one case), Paton [4] (two cases) and Allende [5] (one case). The classic syndrome consists of adiposo-

Incidence of Cardinal Manifestations in Seventy-Seven Cases

	Present	Absent	Not Reported
Retinal pigmentary degeneration	61	9	7
Obesity	72	1	3
Mental deficiency	60	7	11
Genital dystrophy	54	7	17
Polydactylism	42	26	9

genital dystrophy, mental retardation, retinal degeneration (frequently pigmentary), polydactylism and familial occurrence. Skeletal defects of various types are frequently noted, as are various other anomalies, such as atresia ani. Ocular defects other than those mentioned—e. g., strabismus, nystagmus and coloboma of the iris—are also encountered. In the cases summarized by Reilly and Lisser the cardinal manifestations of the syndrome were present in the frequency shown in the table. The complete syndrome according to their criteria was present in only twenty-five cases. In ten cases it was questionably complete;

1. Reilly, W. A., and Lisser, H.: Laurence-Moon-Biedl Syndrome, Endocrinology **16**:337-357, 1932.

2. Cockayne, E. A.; Krestin, D., and Sorsby, A.: Obesity, Hypogenitalism, Mental Retardation, Polydactylism, and Retinal Pigmentosa—the Laurence-Moon-Biedl Syndrome, Quart. J. Med. **4**:93-120, 1935.

3. Jenkins, R. I., and Poncher, H. G.: Pathogenesis of the Laurence-Biedl Syndrome, Am. J. Dis. Child. **50**:178-186 (July) 1935.

4. Paton, L.: Two Brothers Having Laurence-Moon-Biedl Syndrome, Proc. Roy. Soc. Med. **29**:751-752 (May) 1936.

5. Allende, I. M.: Laurence-Biedl Syndrome: Case, Semana méd. **2**:841 (Sept. 24) 1936; abstr., J. A. M. A. **107**:1680 (Nov. 14) 1936.

in twenty-six it was partial (the patient showed either the retinal changes or polydactylism), and in fifteen the diagnosis was doubtful. The review by Cockayne and his co-workers agrees in essential details with that of Reilly and Lisser. Our recheck of eighty-six reported cases showed that in fifteen or possibly less the syndrome could clearly be called classic; i. e., all the cardinal phenomena were present. It may be, however, that if familial occurrence had been excluded as an essential phenomenon because in a few instances only one member of a family could be examined or only one child resulted from a union, the syndrome could be considered classic in more cases. Also, many of the earlier case reports failed to include sufficient data on many of the manifestations now considered essential phenomena of the syndrome. Early interest was directed almost entirely to the occurrence of pigmentary retinal degenerative changes in siblings.

Fröhlich's syndrome is too common to be considered a medical rarity. Briefly, it is characterized by adiposogenital dystrophy with excessive fatty deposits around the abdomen, hips, thighs, breasts, upper parts of the arms and back of the neck. In the male it produces a characteristic feminine appearance. The penis and testes show hypodevelopment, and the pubic hair is feminine in distribution. As a rule the fingers are long and tapering. The patients are usually of normal intelligence, although they may undergo psychic changes secondary to their appearance and sexual underdevelopment.

ETIOLOGY

It is generally conceded that the Laurence-Moon-Biedl syndrome is primarily a familial syndrome and presumably hereditary. Ornsteen [6] attributed the adiposogenital dystrophy to an embryonic developmental defect of the diencephalon and the retinitis pigmentosa and the mental defect to a developmental defect of the prosencephalon. He considered the polydactylism a concurrent anomaly, not genetically associated. Jenkins and Poncher regarded the syndrome as a result of linkage between three genes, one linkage accounting for the adiposogenital dystrophy, one for the retinal changes and one for the polydactylism. They suggested the possibility that the mental deficiency is also the result of linkage between genes. Cockayne, Krestin and Sorsby agreed with this theory. Their genetic studies of cases reported led them to the conclusion that the defect is inherited as an autosomal recessive character, but they doubted that the mutation of a single gene causes

6. Ornsteen, A. M.: Contribution to Pathogenesis and Heredity of Laurence-Biedl Syndrome (Dystrophia Adiposo-Genitalis, Retinitis Pigmentosa, Mental Deficiency and Polydactylism): Report of Three Cases, Am. J. M. Sc. **183**: 256-268, 1932.

the skeletal defect and the retinal changes, the adiposogenital dystrophy and the mental deficiency. They thus confirmed Jenkins and Poncher's findings.

That the disease is familial is without question, for it has been reported in half of the offspring in many cases and in two or more in many. In no case, however, was it reported in an ascendant. On the other hand, positive evidence in the parents and relations of syphilis, polydactylism, glandular defect, psychic disturbance, mental deficiency, consanguineous marriage, alcoholism and blindness has been recorded.

It must be added that in many of the cases reported in which the familial occurrences of the syndrome was emphasized the complete syndrome was exhibited by not more than one of the siblings, the others showing only one or two of the cardinal manifestations. The diagnosis frequently rested on the sum of the manifestations among the siblings.

One may conclude, then, that at the present time the etiology of the Laurence-Moon-Biedl syndrome rests on the theory that it is the result of a genetic mutation in which at least three genetic factors are involved. The aforementioned authors stressed the genetic approach to the subject. They paid little attention to the almost universal manifestation (mental deficiency) of the syndrome except to state in many instances that the mental defect was profound. Little attention has been given to the possibility that the mental defect is the factor of primary importance and that the anatomic manifestations are merely secondary phenomena. Yet only the adiposogenital dystrophy is more universally found, and this, of course, is the physical phenomenon that probably calls attention to the other manifestations of the syndrome.

Unfortunately, only one autopsy report is available, so the actual pathologic processes indicated by the syndrome must be inferred from its manifestations.

This is not the case with Fröhlich's syndrome. The frequency with which this syndrome occurs has permitted reports of numerous post-mortem examinations and of more detailed antemortem laboratory examinations to accumulate in the literature. In Fröhlich's original case the condition was described as being the result of a pituitary tumor. Later cases of similar syndromes resulting from pituitary tumor seemed to substantiate this opinion. However, as more and more reports accumulated it became evident that more than one factor could operate in the production of a typical clinical Fröhlich syndrome. Extrasellar tumor could produce it. Frequently the lesions were found in the hypothalamus. This threw considerable doubt on the pituitary origin of the syndrome, for pressure on the hypothalamus from a pituitary tumor could be ruled out only with considerable difficulty. It is now conceded that the syndrome can occur with tumor, hemorrhage, infection or cyst within the sella turcica or can result from fracture of the skull, hydro-

cephalus, cyst or tumor located outside of the sella turcica but able to produce pressure on the region surrounding or adjacent (the hypothalamus) to the pituitary gland. It has also been proved that the syndrome can appear in the absence of any demonstrable pathologic process within or about the sella turcica or in the hypothalamus.

Not only is there actual demonstrable pathologic change to be pointed out as the causative factor in some cases, but in many of the cases in which no such change can be observed a strong familial tendency to glandular dysfunction of one type or another is noted. Often, too, the disorder appears in infancy, before malfunction of the pituitary would be likely to be produced by external factors.[7]

The present status of medical knowledge indicates beyond reasonable doubt that the seat of the lesion causing the obesity is in the hypothalamus and that the seat of the lesion causing the hypogenitalism is in the hypophysis. These two areas are embryonically and anatomically connected, and there is good reason to believe that the innervation of the pituitary gland originates in a center in the hypothalamus. This leads to the conclusion that the Fröhlich syndrome is due to pathologic change or faulty function either in the hypothalamus or in the hypophysis or in both. It is interesting that Peet [8] has reported cases in which infantilism without obesity was associated with adamantinoma of the pituitary gland. Other writers have reported cases of typical girdle type obesity without genital dystrophy in which the condition developed after puberty, i. e., after the time that the genitals normally approach adult size. One can conclude only that in cases in which no definite lesion can be demonstrated as the causative agent the main seat of the malfunction which produces the adiposogenital dystrophy is in the hypothalamus. Recent studies seem to confirm this belief.[9]

COMMENT

To facilitate the discussion of the relation between the two syndromes, it is necessary to divide the cases in which the cause was different but which were nevertheless all classified as cases of Fröhlich's syndrome into two groups—those in which a pathologic condition was demonstrable and those in which no causative factor, such as tumor or hydrocephalus, was demonstrable. To the latter we wish to apply the term primary cases. We would reserve the term secondary cases for those in which some definite cause can be found other than a hereditary

7. Wolf, William: Endocrinology in Modern Practice, Philadelphia, W. B. Saunders Company, 1936.

8. Peet, M. M.: Pituitary Adamantinomas, Arch. Surg. **15**:829-854 (Dec.) 1927.

9. Cohn, Stanley: Review of Neurology and Psychiatry for 1935-1936, Arch. Int. Med. **58**:1111-1123 (Dec.) 1936.

disposition to glandular dysfunction. For the present we shall limit our comments to the primary type.

In the genetic approach to the etiology of the Laurence-Moon-Biedl syndrome, as has been mentioned, investigators have been primarily interested in the cause of the three anatomic abnormalities associated with the syndrome, i. e., the adiposogenital dystrophy, the pigmentary retinal changes and the polydactylism. However, the mental deficiency is as universal a manifestation; it is much more universal than the polydactylism and is found with slightly greater frequency than the retinitis pigmentosa. If the other phenomena are the result of genetic mutations, then the mental deficiency must likewise result from it. This statement, we feel, is not too dogmatic, for mental deficiency is an integral part of the syndrome and must be etiologically associated. However, primary mental deficiency "cannot be considered as a simple mendelian recessive character and if there is a mendelian inheritance it is multifactorial."[9] This indicates that if one is to accept the theory that genetic mutations are responsible for the manifestations of the syndrome, innumerable genes must be involved, a theory that is indeterminable through present knowledge of genetics. It has never been proved that primary mental deficiency follows or approaches the mendelian law of inheritance. In fact, more proof is available to the contrary. However, the condition is known to result when the germ plasm of the ascendants has shown evidence of being degenerative. It is known also that the more profound the defect in the ascendants the more profound the defect in the descendants is likely to be and that the more profound the mental defect in the descendants the more likely one is to encounter skeletal and visceral defects and degenerative phenomena of the special sense organs.

Contrary to Ornsteen's belief that the retinal changes are associated with a defect in the embryogenesis of the prosencephalon, recent investigations show it in all probability to be associated with a defect in the hypothalamus, that is, in the same area where a defect will produce obesity of the so-called girdle type. Thus, two of the outstanding manifestations of the syndrome are anatomically and physiologically related. The brain is an embryologically, anatomically and physiologically integrated organ. In primary mental deficiency, actual agenesis or incomplete genesis of nerve cells occurs.[10] If the defect is profound, it is reasonable to assume that the defect in embryogenesis is not confined to the psychic centers alone but may involve other centers, such as the hypothalamus. It may involve these centers either directly, through agenesis or underdevelopment of the nerve cells of the centers, or through incomplete control of the centers by the defective higher centers

10. Tredgold, A. F.: Mental Deficiency, Baltimore, William Wood & Company, 1929.

in the cerebral cortex. We have considerable experimental and clinical evidence to show that the lower centers of the brain do not function entirely independently of the higher centers. Peripheral manifestations of cerebral defect involving the lower centers of the brain occur in other syndromes in which the mental defect is profound, notably in Bourneville's tuberous sclerosis and in Recklinghausen's neurofibromatosis.

The glands of internal secretion are intimately associated with the autonomic nervous system, and research has shown that the pituitary gland is presumably innervated by fibers arising in the hypothalamus. Therefore, it is not beyond probability that the atypical retinitis pigmentosa and the adiposogenital dystrophy are intimately associated with the mental deficiency and secondary in importance to it and that the primary factor in the production of these phenomena is the defective germ plasm which produces the mental defect. It might be added that mental deficiency of the primary type does occur, just as does the Laurence-Moon-Biedl syndrome, in the absence of significant heredity, but this is the exception rather than the rule.

The polydactylism is the least constant of the cardinal manifestations of the syndrome. To account for its presence we are inclined to Ornsteen's belief that it is a concomitant skeletal anomaly, probably another manifestation of the defect in the germ plasm. Skeletal defects in mentally deficient persons are common. In such persons one encounters hypertelorism, defect of the sphenoid bones, congenital absence of fingers, toes and auricles, spina bifida, clubfoot, microcephaly and oxycephaly. One occasionally finds in a mentally defective person polydactylism not associated with retinal changes or adiposogenital dystrophy. It is found also in siblings of patients with the Laurence-Moon-Biedl syndrome. Polydactylism itself seems to be an inherited defect, and it was encountered in some of the ascendants in reported cases of the Laurence-Moon-Biedl syndrome. No study has been made of the frequency with which this anomaly occurs in persons with normal mentality in comparison with its occurrence in persons who are mentally defective. Such a study might throw some light on the question.

We conclude, then, that the Laurence-Moon-Biedl syndrome is the result of the primary amentia, which in turn results from defective germ plasm. If there is a genetic mutation it involves so many genes that it is safer to indict the entire germ plasm rather than any special set of genes, for entirely too little is known about genetic laws in human inheritance, particularly when they apply to control of various centers in an organ as complicated as the brain, for a reasonable hypothesis to be formulated. We feel that this hereditary conception in its broad sense is more acceptable than the theory of genetic mutations.

In the primary type of Fröhlich's syndrome one finds again a strong hereditary tendency, a tendency to disturbances of the endocrine glands. As we stated before, the more profound the defect in the ascendants the more profound are the defects in the offspring. One symptom is common to both the Fröhlich syndrome and the Laurence-Moon-Biedl syndrome, i. e., adiposogenital dystrophy. Here the similarity between the syndromes from a clinical standpoint ends. However, each is apparently the result of defective germ plasm. The difference in the heredity between the two seems to be a difference in degree. In Fröhlich's syndrome the defect is apparently mild, for one finds it resulting in the ascendants in from mild to severe endocrine disturbances and not producing in the offspring such profound stigmas of degeneration as mental deficiency, skeletal defects or defects of the special sense organs. On the other hand, the heredity in the Laurence-Moon-Biedl syndrome is more profound and indicates that the germ plasm has been more severely affected. One finds in the ascendants such stigmas as mental deficiency, syphilis, alcoholism, blindness or psychoses; consanguineous marriages may have taken place. In brief, in the two syndromes the hereditary influences show evidence of defective germ plasm; in one the defect is profound and degenerative, and in the other it is mild and not typically degenerative. It is possible, therefore, that the two syndromes are related, the difference being one of degree and not of kind. The fact that a summary of the reported cases of the Laurence-Moon-Biedl syndrome shows that less than 30 per cent of the patients exhibited the syndrome in its entirety also indicates that the variety and number of manifestations of the defect in the germ plasm depend on the profundity of that defect. From a purely clinical standpoint this may be interpreted as indicating that the more profound the mental defect the more phenomena of the syndrome will be encountered.

The series of cases reported in this paper present some interesting data. In cases 1 and 2, occurring in brothers, study of the patients' heredity showed a profound defect in the germ plasm; the father and possibly the mother were mentally deficient, and of four living children only one was normal. Among the three mentally defective children we found all the stigmas common to the Laurence-Moon-Biedl syndrome: night blindness (indicating atypical or typical retinitis pigmentosa), skeletal defects, microcephaly, profound mental deficiency (in all, the mentality was of the imbecile grade), adiposogenital dystrophy (in two of the three) and other ocular defects—strabismus, congenital hyperopia and nystagmus. In these two cases alone, of all the cases in the series in which the mental defect was of the primary type, we observed the lowest level of intelligence, intelligence quotients of 31 and 42, respectively. In case 3 the heredity was also strong, indicating a profoundly defective germ plasm. But the defect in the germ plasm was

not as great as that in cases 1 and 2, for the other siblings showed only mental retardation and not mental deficiency. On further contact with the family in this case, it was ascertained that the other siblings were of high enough intelligence to remain outside of institutions for the care of the mentally deficient, though they were definitely retarded mentally. The patient showed adiposogenital dystrophy and mental deficiency but no retinal degenerative phenomena. However, he did show stigmas of defective skeletal and visceral development, i. e., tortuosity of the retinal vessels, vestigial syndactylism and coloboma of the iris. His level of intelligence was of the moron grade, a grade higher than that in cases 1 and 2. The mental defect was therefore less severe and the manifestations of the syndrome fewer than in those cases. In case 6 the mental level was higher than that in cases 1, 2 and 3, and from what is known of the heredity the patient showed less evidence of the profound defect in the germ plasma encountered in those cases. We encountered in this case only adiposogenital dystrophy, mental defect and mild nystagmus. The condition approached the Fröhlich syndrome more nearly than the Laurence-Moon-Biedl syndrome.

It is impossible to determine whether case 9 was a case of primary or of secondary amentia. There was a strong history of endocrine disturbances and mental defect, but there was also a history of an injury at birth which could have produced any or all of the symptoms encountered. The evidence to indicate a profound defect in the germ plasm was strong, but in view of the fact that an injury at birth can produce all the symptoms and signs the patient exhibited, we could not ascertain which of the etiologic factors exerted the most influence.

Cases 4, 5, 7 and 8 were cases of secondary amentia. They add further confirmation of the fact that injury by infection or injury at birth is capable of producing not only mental defect but pathologic change in the region of the hypothalamus. Case 5 is particularly interesting, for while there was an apparently profound injury at birth, as indicated by the physical findings and the early history, obesity of the so-called girdle type was present without genital dystrophy. In this case the findings were the opposite of those in Peet's cases of pituitary adamantinoma, in which there was genital hyperplasia but no obesity. This seems to indicate that there was probably injury (hemorrhage?) in a circumscribed area of the hypothalamus, the area that controls the fat metabolism. The adiposogenital dystrophy in case 4 was probably the result of inflammation of the brain, toxic or infectious, associated with an attack of influenza. We have in our institution several patients in whom the mental defect followed influenza associated with convulsions. In case 7 the condition was the result of meningitis. In case 8 it was classified as secondary to an injury at birth. In case 10 it may

have been secondary to some infection of the brain, but our history is too incomplete for us to be certain. The low grade of intelligence in conjunction with the history of a severe illness at the age of 3 months is presumptive evidence. In cases 11 and 12 the history is unfortunately too incomplete for us to draw any conclusions. We were unable to locate any one able to give us further information on these two cases.

SUMMARY AND CONCLUSIONS

Twelve cases of girdle type adiposity occurring in mentally deficient boys are presented.

The findings previously recorded in the literature on two syndromes characterized by adiposogenital dystrophy, namely, the Laurence-Moon-Biedl syndrome and the Fröhlich syndrome, are reviewed.

It is suggested that in the Laurence-Moon-Biedl syndrome the manifestations are secondary to the mental defect and are the result of the defect in the germ plasm which produces the mental defect.

It is suggested that cases heretofore classified as cases of Fröhlich's syndrome with no regard for etiologic factors be divided into primary and secondary cases, depending on the presence or absence of demonstrable pathologic change as the cause of the signs and symptoms.

Evidence is offered to support the hypothesis that the Laurence-Moon-Biedl syndrome and the primary type of the Fröhlich syndrome are the result of defective germ plasm, that the Laurence-Moon-Beidl syndrome is not a distinct clinical entity but a symptom complex varying in its manifestations with the degree of defect in the parental germ plasm and that the syndromes studied differ in the degree rather than in the kind of defect.

Cases of girdle type obesity secondary to infection and trauma at birth are presented. One case is particularly interesting in that the patient showed hypothalamic involvement without pituitary manifestations.

It is suggested that in the future a more careful check on the family history, the early history and the degree of the mental defect be made in cases of adiposogenital dystrophy.

Dr. Chester Nordstrom performed the examinations of the eyes in the cases reported.

ADSORPTION OF THE POLIOMYELITIS VIRUS BY CHOLESTEROL

JOHN A. TOOMEY, M.D.
CLEVELAND

White-fibered, or medullated, nerve tissue contains about 5 per cent of cholesterol. Gray-fibered tissue, which has an affinity for poliomyelitis virus,[1] contains only 0.7 per cent. Could cholesterol act like a colloid and absorb or in some way inactivate the virus in vitro?

Ordinary commercial cholesterol crystals were obtained in the open market. A ball mill was set up in the icebox. One gram of cholesterol was added to 6 cc. of a 1 per cent suspension of potent purified virus, and the whole was ground for twelve hours. The material was then centrifugated. The white top layer of cholesterol excess was spooned off under sterile conditions. The remaining material was slightly opaque. One-tenth cubic centimeter of a 1 per cent solution of Flexner's M. V. strain of the virus produced quadriplegia in practically all the Macacus rhesus monkeys, which weighed about 5 pounds (2.3 Kg.). Because the cholesterol might increase the bulk at the possible expense of the virus content of a fluid suspension, it was decided to use more than 0.1 cc. for the tests. Therefore, 0.15 cc. of the suspension containing cholesterol was injected intracerebrally into one monkey and the same amount of a suspension of purified virus without cholesterol into another. The monkey that received the suspension containing cholesterol was protected, although he was furred on the eighth day after the injection. Quadriplegia developed in the other animal. This experiment was repeated four times with Flexner's M. V. strain of the virus. In all, three different lots of commercial cholesterol were used. In these and the subsequent experiments, the suspensions containing cholesterol were centrifugated at high speed until the fluid beneath the top layer of cholesterol was clear. A long thin needle attached to a syringe was thrust through the white top layer, and only the clear fluid was withdrawn and used. All injections were made intracerebrally, with the animal under deep ether anesthesia.

The results in three sets of animals were identical with those in the first set of animals. In the remaining set, the animal that received the suspension containing cholesterol had slight weakness of the legs on the eighteenth day after the injection; the control animal had generalized paresis on the seventh day and complete quadriplegia on the fourteenth day. Even in this set of animals there was an obvious difference in the results, and it was interesting that the animal which received the suspension containing cholesterol recovered completely. There had been no natural immunity, since the animals which did not contract the infection after they received the suspension containing cholesterol all contracted it subsequently when they were given an injection of a suspension of the purified virus without cholesterol in the opposite hemisphere.

From the Department of Pediatrics of the Western Reserve University School of Medicine, and the Division of Contagious Diseases of the City Hospital.

1. Bodansky, Meyer: Introduction to Physiological Chemistry, ed. 2, New York, John Wiley & Sons, Inc., 1930, p. 496.

To 10 cc. of a 10 per cent suspension of Australian virus (source, Kramer), 2 Gm. of cholesterol was added, and the material was prepared in the manner described. One animal received an injection of 0.15 cc. of this suspension, and another, 0.15 cc. of a suspension without cholesterol. The first animal remained active although furred for a few days. Weakness of the legs developed in the second monkey; this gradually became more definite, and finally, on the nineteenth day, the legs became flaccid.

To 10 cc. of a 10 per cent suspension of the W. E. strain (source, Trask) was added 2 Gm. of cholesterol, and the material was prepared in the manner outlined. One animal received an injection of 0.15 cc. of this suspension and another, 0.15 cc. of a suspension without cholesterol. The first animal was furred on the ninth day, and there was possible weakness of the left arm. Further paralysis did not develop, but the animal died on the thirty-fourth day as a result of infestation with worms. Quadriplegia developed in the second animal on the eighth day. In a repeat experiment, the animal which received the suspension containing cholesterol did not contract the disease, while the control animal did.

To 10 cc. of the Trask strain (source, Kramer) was added 2 Gm. of cholesterol, and the material was prepared in the usual way. One animal received an injection of 0.15 cc. of this suspension, and another, 0.15 cc. of a suspension without cholesterol. The first animal was active at all times. In the second animal, flaccid paralysis of the left leg and slight weakness of the right leg and foot developed. This strain did not seem so virulent as the others, but the difference was, nevertheless, obvious.

The same procedure was followed with Kramer's virus (source, Kramer) in a 10 per cent suspension. Quadriplegia developed both in the animal which received an injection of the suspension containing cholesterol and in the control animal which received the suspension without cholesterol. The percentage of virus was decreased to 5 per cent, and the experiment was repeated; the results were identical, both animals contracting poliomyelitis. The Kramer strain was extremely potent, nearly as virulent as the Flexner M. V. strain. The percentage of virus was cut to 1.5, and the experiment was repeated. The animal which received the suspension containing cholesterol remained well. Quadriplegia developed on the eighth day in the control animal, and the animal died. This experiment was repeated, with identical results.

Suspensions of Flexner's M. V. strain of the virus were ground in a ball mill in order that it might be determined whether the physical act of grinding had any effect on the virulence of the suspension. Two M. rhesus monkeys were given injections of the ground suspension, and two, injections of the same suspension unground. All four animals contracted poliomyelitis.

When "drisdol" (purified vitamin D in propylene glycol) was added to the suspension and ground in a ball mill, the virus was not adsorbed or destroyed, its virulence remaining the same. Thus the mechanical effect of grinding may be ignored as a factor in lessening the virulence of the suspension of virus in other experiments.

In instances, then, in which the approximate minimal disease-producing dose of the various strains used was ascertained, the virus was rendered inactive by the addition of cholesterol in the manner described.

COMMENT

Absorption and easy spread of the poliomyelitis virus take place along the gray nerve fibers. Contact between the virus and these fibers is possible only in certain areas of the body—in the olfactory

area, along the first and the thirteenth nerve;[2] in the area of the chorda tympani, along the seventh nerve,[3] and in the gastro-intestinal area, along the sympathetic or parasympathetic nerve fibers.[2] Clinical evidence points to the gastro-intestinal area as the natural place of absorption.[2] Spread of the virus along the vagus nerve (actually a set of white connector fibers) is not the rule clinically. Spread along the sympathetic nerves may be stopped by the preganglionic white connector fibers. Certainly the disease occurs in the average case in muscles the nerve supply of which is from segments which have no white rami communicantes between the sympathetic and the somatic nerves. In the human being, white rami communicantes are absent above the first thoracic and between the third lumbar and the second sacral segments. Since the virus does not seem to spread well along medullated nerves, it is plausible to suppose that it may be stopped by the factor that constitutes the only marked difference between gray and white nerve fibers, namely, the myelin. Conversely, one could deduce that if the myelin is unhealthy the spread of the virus may not be stopped. One might theorize that the myelin of the normal nerve fibers in the human economy functions as a colloidal chemical and adsorbs the virus of poliomyelitis. If this is true, natural protection against the disease depends on the state of the myelin in the nerves and natural inherent immunity is a question of colloidal balance, with protection in the average case depending on the presence of a sufficient amount of phospholipids in the myelin.

Virus adsorbed by healthy myelin in normal persons could be in a state of colloidal equilibrium and give little or no symptoms of its presence after injection via the gastro-intestinal tract. Certainly it is difficult to give a monkey the disease by this route if the animal has previously been fed adequate amounts of vitamin D.[4] When the myelin is insufficient the nerves are unprotected, and toxins produced in the intestines may be absorbed by and travel over these nerves as far as their cells of origin. If there should be little or no adsorption of the virus by the diseased myelin, then paralysis could occur in the human being when the virus spreads directly from the intestines, over the nerves to the spinal cord or the bulbar areas, to cells probably saturated with the products of gastro-intestinal stasis, chiefly the enteric

2. Toomey, John A.: The Gastrointestinal Portal of Entry in Poliomyelitis, J. Pediat. **8**:664, 1936.

3. Toomey, John A.: The Seventh Nerve as a Possible Pathway for the Transmission of the Virus of Poliomyelitis, Am. J. Dis. Child. **51**:58 (Jan.) 1936.

4. Toomey, John A.: The Ingestion of Vitamins A, B, C and D and Poliomyelitis, Am. J. Dis. Child. **53**:1202 (May) 1937.

toxins. This point has been alluded to previously.[5] Destruction of cells would occur at once; neuronophagia would follow; the secondary effects of the infection, i.e., lymphocytic infiltration and perhaps perivascular cuffing, would appear, and acquired immunity would result.

Natural immunity to poliomyelitis could be a question of colloidal balance and adsorption; acquired immunity, with the formation of antibodies, the result of an attack of the disease in one who lacks this colloidal balance and the ability to adsorb or destroy the virus.

5. Toomey, John A.: Intranasal or Gastrointestinal Portal of Entry in Poliomyelitis, Science **82**:200, 1935.

STUDIES ON OXYURIASIS

IV. SOME ASPECTS OF THE PROBLEM OF THERAPY

WILLARD H. WRIGHT, PH.D.
AND
ELOISE B. CRAM, PH.D.
WASHINGTON, D. C.

The subject of oxyuriasis is receiving attention as a group project in the Division of Zoology, and in connection with this study considerable time has been devoted to the question of therapy. From our experience in attempting, in cooperation with physicians, to treat successfully persons infested with pinworms and to eradicate infestations from individual patients and from family groups, we propose to discuss some of the problems involved in the treatment for this condition.

The treatments for oxyuriasis recommended in the medical literature are legion, and obviously it would not be possible or desirable to attempt to ascertain by critical tests the exact value of all these therapeutic measures. Neither does it seem worth while to enumerate all the various drugs and methods of therapy recommended. Hall [1] has reviewed many of them.

The following classifications embrace most of the different methods of control described in the medical literature: treatment with single doses of anthelmintics; treatment with repeated doses of anthelmintics; treatment with drugs which chemically hold no promise of anthelmintic value; application of hygienic measures alone; use of hygienic measures in conjunction with certain therapeutic measures; treatment by purgation, either with single doses of purgatives or with repeated doses of purgatives administered over a period of time; treatment with enemas, medicated or nonmedicated, with or without oral medication; treatment with rectal plugs; treatment with suppositories; treatment with anal ointments; use of various mechanical methods to prevent dissemination of the ova, and treatment with dietary measures.

From a survey of the literature on this subject, it appears that many, if not all, of the recommendations for the use of specific drugs or for various methods of therapy are based on clinical observations

---

From the Division of Zoology, National Institute of Health, United States Public Health Service.

1. Hall, Maurice C.: Pinworm Infection in Man and Its Treatment, Therap. Gaz. **39**:611 (Sept. 15) 1923.

only or on a too limited or otherwise inadequate examination for evidence of infestation persisting after treatment and that no attempt has been made on the part of most writers to check adequately and in a critical manner the actual value of the method or methods they advocate for removal of the worms. Apparently, a temporary clinical improvement or the failure to observe worms in the stools have been the criteria usually accepted as indicating the eradication of the infestation.

It is a fact known to parasitologists and to well informed physicians that the ova of Enterobius vermicularis are not deposited in the intestinal canal, as are those of hookworms, ascarides and many other worms, but are expelled by the gravid female after it has migrated out of the anus and onto the perianal region. For this reason, the examination of samples of stools for pinworm ova is a haphazard and unreliable method of diagnosing pinworm infestation. The stools of the vast majority of patients with pinworms will not reveal pinworm eggs, and although the occasional positive findings are significant, the negative findings afford no information as to the existence or absence of infestation. In 102 examinations of the stools of persons infested with pinworms, we found pinworm ova in only fourteen cases, and most of the patients were persons heavily infested with worms, as determined by subsequent treatment. In other words, the results were misleading in about seven of every eight cases.

METHOD OF JUDGING EFFICACY OF TREATMENT

Before any studies of oxyuriasis could be undertaken with the hope of fruitful results it was necessary to devise a reliable method of diagnosis by use of some form of anal swab or anal scraper to collect the eggs deposited in the perianal region. To be satisfactory, the anal swab or scraper must meet the following requirements: It must be of such material that pinworm ova, if present, will regularly adhere to it; it must be in such form that it can be transported from the hospital, clinic or home to the laboratory without loss of parasite material and without danger that infective material will be transferred to other persons; it must be of such design that it can be examined accurately in the laboratory with a minimum of handling and effort, and, in the interests of economy, its base should be constructed of such heat-resisting material that it can be sterilized and used repeatedly or of such cheap material that it can be used and discarded. Investigations in the Division of Zoology led to the development of a cellophane swab that has fulfilled all these specifications and has proved eminently satisfactory in over 3,000 examinations. This swab has been described

in detail by Hall,[2] as the NIH swab, and has been used by us in making the diagnosis in cases of oxyuriasis and in checking the results of treatment. In evaluating any method of therapy it is desirable to make as many examinations by swab as possible, depending on the availability of the patient, during the second and third weeks following the treatment. According to the present knowledge of the life history of the parasite, this interval would probably be sufficient for the development to maturity of any pinworm larvae not removed by the treatment.

FACTORS COMPLICATING CONTROL AND TREATMENT

The treatment of oxyuriasis involves, among other considerations, one of great importance. To be efficient, any method must be 100 per cent effective in almost all cases; otherwise it is of only limited utility in the control of the disease. If a single dose of an anthelmintic removes 90 per cent of the hookworms harbored by a person suffering from clinical ancylostomiasis, the treatment will usually have reduced the infestation from one of clinical significance to one of subclinical or nonclinical significance, and it will remain in this status or become completely eradicated if the patient exercises the simple precautions necessary to prevent reinfestation. In the case of oxyuriasis, however, the removal of 90 per cent of the worms by any anthelmintic treatment affords only transitory relief, and unless the patient is one of the exceptional persons who can and will carry out the complex procedures necessary to prevent reinfestation, the residual infestation will in a short time be built up to a higher level and often to a point at which clinical symptoms recur. The requirement, then, for a satisfactory treatment as opposed to a palliative treatment is practically absolute efficiency, a requirement not necessarily applicable, or at least not applicable to the same extent, in the case of anthelmintic treatment for other parasitic infestations.

One regimen for an attack on oxyuriasis would consist in the administration of an anthelmintic which in a single dose would remove all worms, including developing larvae, and the application of rigid hygienic measures to prevent the ingestion of infective material until the ova remaining in the patient's surroundings would be killed by desiccation or other unfavorable factors. However, at present we do not possess in our armamentarium any anthelmintic which will meet the aforesaid requirement, nor do we think it at all practical in most economic groups, or perhaps in any group, to attempt to carry out the measures which are essential for the complete elimination of all infec-

2. Hall, Maurice C.: Studies on Oxyuriasis: I. Types of Anal Swabs and Scrapers, with a Description of an Improved Type of Swab, Am. J. Trop. Med. **17**:445 (May) 1937.

tive material and the consequent exclusion of all possibility of reinfection. Since pinworm eggs are scattered on underwear, night clothing, other clothing, bed linen, towels, wash cloths, soap, floors and upholstery and furniture in general, it appears next to impossible to carry out hygienic measures in a manner sufficiently rigorous to prevent reinfestation, and this is particularly true in group households of low economic status, in which families of ten or twelve members are sometimes living in one or two rooms and the crowded conditions make pinworm infestation particularly prevalent.

In lieu of the use of an effective single dose anthelmintic, the use of an effective and relatively nontoxic anthelmintic, administered in daily doses over a period of time, would fulfil practically all the specifications for suitable treatment. This method would have the advantage of controlling reinfestation during the period in which the drug was being given if it eliminated larval worms shortly after the ingestion of infective material, and the treatments could be extended over the period during which infective eggs could survive in the patient's environment. Repeated treatments would also give the optimum conditions for getting the drug into the cecum and the appendix, and this is particularly important because it is probable that worms in these organs frequently escape the usual one treatment therapy and are a source of subsequent reinfection. Santonin, one of the few anthelmintics given in this manner, has been recommended frequently for oxyuriasis, but our tests have indicated that its use is not a satisfactory treatment.

Another of the difficulties in connection with the control and treatment of oxyuriasis lies in the fact that the condition is all too frequently a familial infestation, as might be surmised from the ease with which infective material is scattered in the household. Studies are being conducted on this phase of the problem and will be reported in detail later by one of us (E. B. C.). The fact that in many cases all the members of the family are infested calls for treatment which will be effective, and yet safe for all, from infants to adults. For use in large family groups the treatment must be relatively simple, so that its application will not be burdensome. To control familial infestations, it is necessary to administer treatment to all the infested members of the family simultaneously, so that the spread of infective ova in the household by all such members can be arrested simultaneously. According to our experience it is practically useless as a control measure to treat some but not all the infested members at one time, since nearly all such persons, even though freed from infestation by the treatment, will promptly become reinfested.

LIMITATIONS OF CERTAIN ANTHELMINTICS

Regarding the control of oxyuriasis by the use of an anthelmintic which would in a single dose remove all worms and by the application of rigid hygienic measures to prevent reinfestation, we have already commented on the impracticability of carrying out such hygienic measures. To be effective for the removal of all oxyurids with a single dose, an anthelmintic would have to be sufficiently soluble to act on larvae present in the small intestine and sufficiently insoluble to pass in part into the large intestine to act on preadult and adult worms located there. In any event, it might fail for mechanical reasons to enter the appendix and would thus leave a residuum which would result in prompt reinfestation.

The anthelmintics which are commonly regarded as the most effective in single doses against most nematode infestations of the human alimentary canal are oil of chenopodium, carbon tetrachloride, tetrachlorethylene and hexylresorcinol. Naturally one would turn first to these drugs in attempting to develop a satisfactory treatment for oxyuriasis. Yet, since a drug is demanded that can be given safely to persons in all age groups, oil of chenopodium and carbon tetrachloride should probably be ruled out, for neither has a margin of safety sufficiently wide to permit of its use generally in the treatment of young children. It may be noted further that Leach [3] and Docherty and Burgess [4] did not find that carbon tetrachloride had a dependable action against pinworms in their cases in which the drug was administered to condemned criminals and the results checked by postmortem examination.

Tetrachlorethylene is a much safer drug than oil of chenopodium or carbon tetrachloride and has a margin of safety sufficient to permit of its use with young children. From the standpoint of water solubility, it lies in a favorable position, since it is of great value for the elimination of certain nematodes located in the small intestine and yet, theoretically, is sufficiently insoluble (1 part soluble in 5,400 parts of water) so that it is probably carried in considerable concentration into the large intestine and is capable of acting on worms located there. This theoretical value is supported by experimental evidence. Tetrachlorethylene is usually administered in a solution of sodium or magnesium sulfate, and children as a rule do not take kindly to solutions of either of these saline purgatives; but in a series of tests we ascertained that by administering tetrachlorethylene in a suitable dose of magnesium

3. Leach, C. N.: Carbon Tetrachloride in the Treatment of Hookworm Disease, J. A. M. A. **78**:1789 (June 10) 1922.

4. Docherty, J. F., and Burgess, E.: The Action of Carbon Tetrachloride on the Liver, Brit. M. J. **2**:907 (Nov. 11) 1922.

citrate solution we avoided this difficulty, since young children do not object to the taste of that mixture. Furthermore, we found that the use of magnesium citrate solution obviates the reactions of nausea, vomiting, headache, dizziness and abdominal pain attendant on the administration of sodium or magnesium sulfate to many persons. According to our experience the adequate purgation which is so essential to safety when anthelmintics are used is obtained with the magnesium citrate solution.

Wright, Bozicevich and Rose [5] have already published a preliminary note on tetrachlorethylene for the treatment of oxyuriasis in children. Unfortunately, the number of cases in which examination gave negative results after a single dose of the drug, six of the eleven cases observed, is not sufficiently high (that is, is not close to 100 per cent) for tetrachlorethylene to fulfil our specifications for a satisfactory anthelmintic for all persons with oxyuriasis. However, it is our belief, based on experience, that the use of tetrachlorethylene is probably the most effective single dose treatment, as established by evidence of adequate posttreatment checks on the persistence of infestation, which is available at the present time and that its use under certain conditions is entirely warranted. Further evidence concerning the efficacy of tetrachlorethylene will be presented in later papers.

In the case of hexylresorcinol, the work of Brown [6] seems to indicate that the drug is of definite value in the treatment of oxyuriasis when administred orally and by enema in repeated doses over a period of time. In Brown's cases, treatment extended over periods ranging between two and thirteen weeks. However, Brown was unsuccessful in his attempts to clear up infestations by the oral administration of a single dose of the drug. Hexylresorcinol, with a solubility of 1 part in 2,000 parts of water, is definitely more soluble than tetrachlorethylene. Robbins,[7] however, found that after the administration of a 1 Gm. dose of hexylresorcinol 18 per cent was excreted in the urine and 64 per cent in the feces; so the drug does pass to and through the large intestine to a considerable extent. So far as is known to us, studies on the absorption of tetrachlorethylene by human beings are lacking; so we cannot compare the extent of absorption of the two drugs. Hexylresorcinol administered orally and by enema or by

5. Wright, Willard H.; Bozicevich, John, and Rose, Joseph: Studies on Oxyuriasis: II. A Preliminary Note on Treatment with Tetrachlorethylene, Virginia M. Monthly, to be published.

6. Brown, H. W.: Treatment of Pinworm (Enterobius Vermicularis) Infestation with Hexylresorcinol, Proc. Soc. Exper. Biol. & Med. **30**:221, 1932.

7. Robbins, Benjamin H.: Quantitative Studies on the Absorption and Excretion of Certain Resorcinols and Cresols in Dogs and Man, J. Pharmacol. & Exper. Therap. **52**:54 (Sept.) 1934.

enema alone appears to be of definite value in some cases of oxyuriasis. With young children we have used the drug in enemas only; we have had excellent results in clearing up the condition in some cases and in other cases it has not responded so satisfactorily. For children under 10 years of age it has been our practice to use 0.5 Gm. of hexylresorcinol to 1 liter of water, or one-half the amount of hexylresorcinol recommended by Brown. Hexylresorcinol has two definite disadvantages: it is expensive, and to be effective it must in most cases be given over a relatively long period; the second objection is applicable to any sort of treatment with enemas alone. These disadvantages are particularly applicable in the case of large family groups, since the cost of the treatment is prohibitive for families in the lower economic brackets and since few parents have the persistence to administer enemas over a considerable period either to themselves or to a large number of children.

THE USE OF ENEMAS

In spite of the general objection noted, the use of enemas is a logical procedure in some cases of oxyuriasis, provided the enemas are given properly and are so spaced as to be effective in removing gravid females before their migration through the anal canal. To be most effective, they should be given with the patient in the knee-chest position, with the buttocks elevated. This position should be maintained for several minutes, after which the patient should lie on the right side to allow gravitation of the fluid across the transverse colon and into the ascending colon. The use of enemas is particularly indicated in the case of children under 4 years of age, since sufficient work has not yet been done to establish both the safety and the efficacy of any anthelmintic administered orally for the removal of pinworms from young children.

In addition to hexylresorcinol enemas, we have used plain soapsuds enemas and have removed as many as 4,000 worms from one patient by a single enema. The frequency with which enemas should be administered depends somewhat on the technic of administration, somewhat on the degree of infestation and somewhat on the possibilities of reinfestation in the household. In a few cases it has been possible to clear up pinworm infestations in young children by giving soapsuds enemas twice weekly. However, in most of these cases the enemas were given by visiting nurses, who as a rule administer them more efficiently than do mothers. In other cases, soapsuds enemas have been given every third night, and in cases of persistent and refractory infestation, every other night. However, there is the danger that the too frequent use of enemas will result in loss of tonus of the large bowel and will be followed by constipation. The course of treatment with enemas and the frequency of application are governed by the degree of infestation and the progress in the particular case. It is advisable to use anal

swabs every other morning or every third morning and no enema should be given the preceding night. In general, to avoid errors in administration, it has been our practice to use hexylresorcinol enemas only when the treatment can be given by a trained nurse. Under other conditions, soapsuds enemas are recommended. So far, the results obtained with hexylresorcinol enemas have been more promising than those obtained with soapsuds enemas.

In a few cases we have used an enema consisting of an emulsion of tetrachlorethylene, coconut oil, soap and water. While a considerable number of worms have been removed by this type of enema, more cases must be observed before conclusions can be drawn as to its value.

ANAL OINTMENTS

The use of anal ointments, so frequently advocated in medical literature, has according to our experience certain advantages in relieving the irritation and pruritus associated with the migration of gravid female worms and the deposition of ova on the perianal region. However, we do not regard any of these ointments as having appreciable value in destroying the tadpole larva within the egg and thus preventing reinfection, a thing claimed for them by many writers. One member of the division staff is studying the action of various ointments on the embryonated ova of Enterobius vermicularis and will report her results in detail later. It is possible that pinworm ova may adhere to an ointment applied over the anal region and that the use of ointments may thus aid in preventing the dissemination of infective ova. For the relief of anal pruritus, 2 per cent phenol ointment U. S. P. seems to have been satisfactory in the few cases in which its use has been investigated by us.

MECHANICAL AND CHEMICAL DEVICES TO HINDER MIGRATION

One writer, Lentze,[8] has advocated the use of cotton plugs inserted into the anus at bedtime to prevent the migration of gravid females. This appears to be a rather bizarre method of treatment and one which would apparently serve only as a temporary expedient. The method was tried by us in several cases, but it was found that the worms migrated in spite of the anal plug.

We have not used suppositories in the treatment of oxyuriasis, but a modification of the idea was tried in a small series of cases. Through Dr. W. A. Feirer, director of the Mulford Biological Laboratories, Sharp and Dohme, Glenolden, Pa., we were supplied with a quantity of hexylresorcinol jelly put up in collapsible 1 ounce (28 Gm.) tubes

8. Lentze, Friedrich August: Infektionen durch Würmer, in Gundel, M.: Die ansteckenden Krankheiten: Ihre Epidemiologie, Bekämpfung und spezifische Therapie, Leipzig, Georg Thieme, 1935.

fitted with a perforated pipe so that the material could be injected into the anal canal and the rectum at bedtime, with the idea of destroying gravid females attempting to migrate through the anal canal. In one case, that of a 4 year old child, the use of this jelly every night for seven nights cleared up the infestation. In other cases, however, evidence indicated that the worms migrated despite the presence of the hexylresorcinol jelly. This method of treatment deserves further trial.

PURGATIVES

The use of purgatives, either in single or in repeated doses, in the treatment of oxyuriasis does not appear to us as a sound procedure. The idea is frequently entertained that purgatives possess anthelmintic value simply because an occasional intestinal parasite may be expelled after the administration of a purgative. However, persons who have tested the action of purgatives have found them practically without value as anthelmintics. We have tried the administration of single doses of purgatives to a small group of patients with oxyuriasis and although each of the patients passed a number of worms, in no case was the infestation eradicated by the use of such treatment.

SUMMARY

Some of the difficulties attendant on the treatment and control of oxyuriasis and the requirements for satisfactory methods of therapy are presented briefly. No method of therapy at present available meets these requirements, since there is no known anthelmintic which in single doses will remove all the worms from every patient or all the worms from nearly every patient and which is sufficiently safe for use with persons of all age groups. In our investigations tetrachlorethylene came closest to meeting these specifications for single dose treatments. The use of a relatively nontoxic anthelmintic in daily doses over a period of time appears to us to be the most desirable method of therapy, but santonin, which is such an anthelmintic, was not effective in our tests. The fact that oxyuriasis is frequently a familial condition complicates the matter of control and necessitates simultaneous treatment of all infested members of the family. The use of enemas, medicated or nonmedicated, with or without oral medication, is of value, but the prolonged course of treatment necessary in most cases discourages the average person, who lacks the persistence to carry out the necessary routine of treatment, particularly in large families in which many persons are infested. The use of anal plugs, medicated jellies and anal ointments may be an aid in the control of the disease but as a rule cannot be depended on to eradicate infestations. Our experience indicates that there is still need for a cheap, effective anthelmintic which can be administered with safety to persons of all ages and which can be used with a minimum of effort.

LOBAR PNEUMONIA IN CHILDREN

DIFFERENTIATION OF RECOVERED PNEUMOCOCCI INTO ETIOLOGIC GROUPS AND THEIR FAMILIAL DISTRIBUTION

ELIZABETH TORREY ANDREWS, M.D.

NEW YORK

During 1931 the families of children with clinical evidence of lobar pneumonia were investigated, in the hope of elucidating factors contributing to the occurrence of the disease. As a compact epidemiologic unit, the family affords an opportunity to determine kinds and potential sources of infection and mechanisms underlying the transmission of infectious material. Since the relative etiologic significance of the types of pneumococcus is not yet fully understood, types recovered from patients will be reviewed with reference to their selection and their importance as causative agents. The familial distribution of pneumococci will be presented in relation to observed differences in their etiologic significance.

In order to insure comparable epidemiologic data, the study has been limited to families of patients with "lobar" pneumonia. This designation is here used to refer to a familiar clinical condition having a typical course and a characteristic pathologic picture. In these respects it embraces a fairly homogeneous group of conditions, readily distinguishable when uncomplicated from other forms of pulmonary infection in children. It is not confined to older children, being found more frequently during the first and second years of life than in later childhood. The close relation between this condition and the pneumococcus as an etiologic agent permits epidemiologic observations which are relatively free from confusing factors.

The differentiation of the first three types of pneumococcus [1] indicated their frequency in the lobar pneumonia of adults. The further separation of types IV to XXXII [2] made possible the identifi-

The study was aided by a grant from the Commonwealth Fund to New York University College of Medicine for research on pneumonia.

From the Children's Medical Division, The Bellevue Hospital, and the Department of Pediatrics, New York University College of Medicine.

1. Dochez, A. R., and Gillespie, L. J.: A Biologic Classification of Pneumococci by Means of Immunity Reactions, J. A. M. A. **61**:727 (Sept. 6) 1913.

2. (*a*) Cooper, G.; Edwards, M., and Rosenstein, C.: Separation of Types Among Pneumococci Hitherto Called Group IV and Development of Therapeutic Antiserums for These Types, J. Exper. Med. **49**:461 (March) 1929. (*b*) Cooper, G.; Rosenstein, C.; Walter, A., and Peizer, L.: Further Separation of Types Among Pneumococci Hitherto Included in Group IV and Development of Therapeutic Antisera for These Types, ibid. **55**:531 (April) 1932.

cation in cases of pneumonia in children [3] of important types formerly included in the unclassified Group IV.[4] Variations in the incidence of types in material collected by swabbing the throats of children with different forms of respiratory infection were commonly observed. Studies of large groups of children, made since the full number of typing serums (Cooper) became available, also indicated the distribution of types according to age, with variations in associated mortality and complications. The reports cited have shown that types I, II, V, VI, VII, XIV and XIX are often found in the throats of children with lobar pneumonia and that types VI and XIX also occur in high proportions of children without pneumonia. Type XIV is especially common in infants with pneumonia, and type II is found less frequently in children than in adults. Types III and VIII, while recognized as important in lobar pneumonia in later life, have also been recovered in significant numbers from persons without pneumonia.[5] Immunologic studies have indicated that types II and V are

3. (*a*) Plummer, N.; Raia, A., and Shultz, S.: Pneumonia in Children: A Bacteriologic Study, Am. J. Dis. Child. **40**:557 (Sept.) 1930. (*b*) Raia, A.: Plummer, N., and Shultz, S.: New Types of Pneumococci in Pneumonias of Children, ibid. **42**:57 (July) 1931. (*c*) Nemir, R. L.; Andrews, E. T., and Vinograd, J.: Pneumonia in Infants and Children: A Bacteriologic Study with Special Reference to Clinical Significance, ibid. **51**:1277 (June) 1936. (*d*) Bullowa, J. G. M., and Greenbaum, E.: Pneumococcic Pneumonia in Infants and in Children, ibid. **53**:22 (Jan.) 1937. (*e*) Viktoroff, L. K.; Ostrovskaia, D. I.; Levtchenko, E. A.; Dombrowskaia, J. F.; Reichert, E. A., and Magarik, S. A.: Bacteriologie des pneumonies de l'enfance, Ann. Inst. Pasteur **58**:253 (March) 1937.

4. (*a*) Lyon, A. B.: Bacteriologic Studies of One Hundred and Sixty-Five Cases of Pneumonia and Postpneumonic Empyema in Infants and Children, Am. J. Dis. Child. **23**:73 (Jan.) 1922. (*b*) Webster, R.: A Study of Incidence of Various Serological Types of Pneumococci in Pneumonia of Childhood: Observations on Serum Therapy, M. J. Australia **1**:129 (Feb. 9) 1924. (*c*) Trask, J. D.; O'Donovan, C., Jr.; Moore, D. M., and Beebe, A. R.: Studies on Pneumonia in Children, J. Clin. Investigation **8**:623 (June) 1930. (*d*) Gundel, M., and Linden, H.: Ueber die Verbreitungsweise der menschlichen Pneumokokkeninfektionen, Ztschr. f. Hyg. u. Infektionskr. **112**:1 (Jan.) 1931. (*e*) Pisek, G. R., and Pease, M. C.: A Preliminary Report on Pneumonias in Children, with Special Reference to Its Epidemiology, Am. J. M. Sc. **151**:14 (Jan.) 1916. (*f*) Wollstein, M., and Benson, A. W.: Types of Pneumococci Found in Pneumonias of Infants and Young Children, Am. J. Dis. Child. **12**:254 (Sept.) 1916. (*g*) Mitchell, A. G.: Types of Pneumococci in Infants and Children, Pennsylvania M. J. **20**:343 (Feb.) 1917. (*h*) Wollstein, M.: Types of Pneumococci Found in Pneumonia of Infants and Young Children, New York State J. Med. **23**:148 (April) 1923. (*i*) Westlund, R. E.: Incidence of Pneumococcus Types in Pneumonias of Children, J. Infect. Dis. **38**:514 (June) 1926.

5. (*a*) Cecil, R. L.; Baldwin, H. S., and Larsen, N. P.: Lobar Pneumonia: A Clinical and Bacteriologic Study of 2,000 Typed Cases, Arch. Int. Med. **40**:253 (Sept.) 1927. (*b*) Blake, F. G.: Observations on Pneumococcus Type III

(Footnote continued on next page)

usually causative while type III is often incidental in patients with lobar pneumonia in whom these types are associated with other pneumococci.[6] Types II and V, "with respect to their close association with pulmonary infection," have been observed to resemble type I[7] and contrast with type III, the significance of which in pneumonia has been referred to debilitating changes in the resistance of the host.[5b]

Contact with patients with pneumonia was early shown to be a factor in the spread of types I and II,[5e,f] and a recent study of families of patients from the children's medical service of the Bellevue Hospital indicated that other types of pneumococcus associated with pneumonia in children were no less communicable.[8] The failure of persons coming in contact with a healthy carrier of type I to become infected has been reported.[9] The observation has been made that "youth favored the carrier state of homologous and heterologous pneumococci" among persons coming in contact with children with lobar pneumonia.[10] Insti-

---

Pneumonia, Ann. Int. Med. **5**:673 (Dec.) 1931. (*c*) Finland, M., and Sutliff, W. D.: Infections with Pneumococcus Type III and Type VIII: Characterization of Pneumonia Caused by Pneumococcus Type III and That Associated with a Biologically Closely Related Organism, Pneumococcus Type VIII, Arch. Int. Med. **53**:481 (April) 1934. (*d*) Cecil, R. L.; Plummer, N., and McCall, M.: Pneumococcus Type III Pneumonia, Am. J. M. Sc. **191**:305 (March) 1936. (*e*) Stillman, E. G.: A Contribution to Epidemiology of Lobar Pneumonia, J. Exper. Med. **24**:651 (Dec.) 1916. (*f*) Stillman, E. G.: Further Studies in Epidemiology of Lobar Pneumonia, ibid. **26**:513 (Oct.) 1917. (*g*) Gundel, M., and Seitz, L.: Die Pneumokokkentypen in der gesunden Bevölkerung, Klin. Wchnschr. **12**:929 (June 17) 1933. (*h*) Smillie, W. G.: Epidemiology of Lobar Pneumonia: A Study of the Prevalence of Specific Strains of Pneumococci in the Nasopharynx of Immediate Family Contacts, J. A. M. A. **101**:1281 (Oct. 21) 1933. (*i*) Christie, I. M.: Epidemiologic Significance of Serologic Types of Pneumococci, Lancet **2**:39 (July 7) 1934. (*j*) Harris, A. H., and Ingraham, H. S.: A Study of the Carrier Condition Associated with Type II Pneumonia in a Camp of the Civilian Conservation Corps, J. Clin. Investigation **16**:41 (Jan.) 1937. (*k*) Nemir, Andrews and Vinograd.[3c]

6. Finland, M., and Winkler, A. W.: (*a*) Antibody Response to Infections with Type III and the Related Type VIII Pneumococcus, J. Clin. Investigation **13**: 79 (Jan.) 1934; (*b*) Antibody Response to Infections with Type II and the Related Type V Pneumococcus, ibid. **13**:97 (Jan.) 1934.

7. Finland, M., and Dowling, H. F.: Pneumococcus Type II and Type V Infections, Arch. Int. Med. **58**:598 (Oct.) 1936.

8. Shultz, S. M.: Study of Certain Epidemiological Factors in Pneumonia of Children, Am. J. Hyg. **15**:80 (Jan.) 1932.

9. Smillie, W. G., and Leeder, F. S.: Epidemiology of Lobar Pneumonia, Am. J. Pub. Health **24**:129 (Feb.) 1934.

10. Bunim, J. J., and Trask, J. D.: Familial Studies on Lobar Pneumonia, Am. J. Dis. Child. **50**:626 (Sept.) 1935.

tutional epidemics of lobar pneumonia in children associated with types I and V have been described,[11] and type II was recently implicated in an outbreak of pneumonia in a camp of the Civilian Conservation Corps.[5j] Multiple familial cases of lobar pneumonia have been observed which were ascribed to types I, II, V, VII, XII, XIV and XXII.[12]

MATERIAL

Cases selected for study were those of children under 12 years of age having a condition diagnosed as lobar pneumonia, who were seen in the wards of the children's medical service of the Bellevue Hospital during a single year. Cases in which the diagnosis was doubtful have been rigidly excluded. The criteria used for diagnosis have been described in a preliminary report from this service.[13] Selection of cases was based on the history, which practically always included a preceding infection of the respiratory tract; on repeated physical and roentgen examinations, giving evidence of localized consolidation; on the course of the fever and the leukocyte count, both of which tend to rise sharply, remain at a high level and fall by crisis, and, when available, on postmortem examinations. Since the presence of empyema on admission masked the underlying pathologic picture, cases in which that condition occurred were excluded.

Material obtained by swabbing the throats of 138 patients with lobar pneumonia was examined bacteriologically [3a,b] by Miss Julia Vinograd in the laboratory established at this hospital under the direction of Dr. W. H. Park. Suspensions in broth of material from swabs were streaked on blood agar plates and, after incubation for three hours, inoculated into mice. At autopsy of the mice, the pneumococci which were recovered from the peritoneal exudate were typed by macroscopic and microscopic agglutination and by macroscopic precipitation. Blood from the heart and peritoneal exudate were streaked on blood agar plates, and confirmation of type was undertaken by agglutination and

11. (*a*) Schroder, M. C., and Cooper, G.: An Epidemic of Colds, Bronchitis and Pneumonia Due to Type V Pneumococci, J. Infect. Dis. **46**:384 (May) 1930. (*b*) Strøm, A.: An Epidemic of Croupous Pneumonia Caused by Pneumococcus Type I, ibid. **50**:430 (May-June) 1932.

12. (*a*) Gundel, M., and Wallbruch, E.: Die lobäre Pneumonie als epidemisch auftretende Krankheit, Deutsche med. Wchnschr. **61**:539 (April 5) 1935. (*b*) Wallbruch, E.: Die lobäre Pneumonie als epidemisch auftretende Erkrankung, Ztschr. f. Hyg. u. Infektionskr. **117**:92 (May 8) 1935. (*c*) Tilghman, R. C., and Finland, M.: Penumococcic Infections in Families, J. Clin. Investigation **15**:493 (Sept.) 1936. (*d*) Finland, M., and Tilghman, R. C.: Bacteriologic and Immunologic Studies in Families with Pneumococcic Infections: Development of Type-Specific Antibodies in Healthy Contact Carriers, ibid. **15**:501 (Sept.) 1936. (*e*) Smillie and Leeder.[9]

13. Smith, C. H.: Pneumonias of Childhood, Proc. Internat. Assemb. Inter-State Post-Grad. M. A., North America, October 1935.

bile solubility tests on cultures from isolated colonies of the heart's blood. The presence of other organisms, as well as of pneumococci, was determined by study of plates streaked from the original swab.

Since young children fail to provide sputum in the usual way, the posterior pharyngeal wall was gently irritated with an applicator to initiate a cough, the tongue being depressed, and the forthcoming secretions were collected on a swab held as close to the larynx as possible. If the first swab did not show pneumococci, a second culture was usually made within a day or two. When pneumonia was suspected at the time of admission, swabs were taken by the admitting intern.

In 11 cases additional material was available for culture, such as pleural and pericardial exudates, blood and the fluid from postmortem lung punctures. One culture of pleural exudate was sterile.

Pneumococci were not recovered from 13 patients for 11 of whom only one culture was made. In 2 cases the second culture was of material obtained at or after the crisis. This result did not, of course, constitute positive evidence for the absence of pneumococci from the lungs, and these 13 cases are not included in the analysis of distribution of pneumococci.

Cultures of material from the throats and detailed histories were obtained from exposed members of a patient's family by a nurse, who visited the homes of 110 patients soon after their admission to the hospital. The interval was longer than four days in 8 instances but never exceeded a week. Cultures were not made for all members of every family. Cultures of material from exposed persons were made only once. In 1 case a parent had lobar pneumonia and was treated in another ward in the hospital. One brother who had not submitted to culture was said to have died of pneumonia a week before the patient's admission.

Swabs of the throat were also obtained from 82 patients in the same wards who had febrile illnesses referable to the respiratory tract but no evidence of pneumonia of any variety. Material from the throats of persons having come in contact with 27 such patients was also cultured, and no concurrent pneumonia was discovered in these families.

Accordingly, there were available for analysis of the distribution of pneumococci the results of 241 cultures of material from 125 children and 1 adult with lobar pneumonia and of single cultures of material from 291 exposed members of the families of 111 of these patients, comprising a group of 402 persons from 107 families. There were in addition 162 cultures made of material from the throats of 143 persons without pneumonia, of whom 88 belonged to 27 families.

SELECTION OF CAUSATIVE TYPE IN PATIENTS WITH LOBAR PNEUMONIA

Epidemiologic analysis of the material involved, at the outet, identification of the pneumococcus responsible for the disease in patients with lobar pneumonia. This was essential not only in evaluating the etiologic significance of pneumococci but in tracing the dissemination of those types actually causing pneumonia and determining factors underlying such dissemination. Selection of causative types was limited by the available evidence, which included cultures of other pathologic exudates than those obtained from the throat in few cases. No immunologic studies were made.

High correlations between types recovered from sputum of adults with lobar pneumonia and those from other sources, such as blood, pleural fluid, and pulmonary exudates, have been reported in large numbers of cases.[14] Such corroboratory evidence was available only occasionally in the cases covered by this study. While uncontaminated sputum has been obtained from older children and bacterial strains recovered from swabs may have issued from the lung, such material may also contain casual inhabitants of the throat or organisms derived from a contiguous focus, such as the nasal passages or the ears, if, indeed, pulmonary exudates are represented at all.[15] The occasional failure of swabs to yield pneumococci in children having clinical evidence of lobar pneumonia emphasizes the technical difficulties in obtaining pneumonic exudates by this route.

In a large proportion of the cases included in this study more than one type of pneumococcus appeared, in some even so many as three different strains of pneumococcus, but direct evidence for mixed infection of the lung was not obtained. Increasingly intensive bacteriologic examination has been shown to be accompanied by increased recovery of multiple bacterial strains.[16] The incidence of multiple types in the throats of these children was higher than that reported for adults. This was particularly true for children in the first three years of life and the first two years after entering school, when half of the patients yielded more than one type of pneumococcus (table 1). Repeated cultures of material from the throat were associated with the recovery of additional types, even during the active disease. In this fact lies a clue to solution of the etiologic problem in such cases.

14. (*a*) Sutliff, W. D., and Finland, M.: Significance of Newly Classified Types of Pneumococci in Disease: Types IV to XX Inclusive, J. A. M. A. **101:** 1289 (Oct. 21) 1933. (*b*) Bullowa, J. G. M.: Reliability of Sputum Typing and Its Relation to Serum Therapy, ibid. **105:**1512 (Nov. 9) 1935.

15. Footnote 4a, b, c and d.

16. Finland, M.: Significance of Mixed Infections in Pneumococcic Pneumonia, J. A. M. A. **103:**1681 (Dec. 1) 1934.

TABLE 1.—*Incidence of More Than One Type of Pneumococcus in Children with Lobar Pneumonia* *

Case Nos.	Under 3 Years	Case Nos.	3-5 Years	Case Nos.	6, 7 Years	Case Nos.	8-12 Years
6D	I, XXXI	1	I, IV, III	34	I, XIX		
7D	I, Uncl. 32						
21	I, XXIII, XIX						
27	I, XI, XIII						
28	I, VI, Uncl. 32						
3D	V, IV, XIX			2	V, XXX, VIII	8	V, VIII
4D	V, XVIII			9	V, VI, III		
30	V, VI, XXX			18	V, XIII, Uncl. 32		
				22	V, VIII		
				29	V, IV		
				31	V, XXVIII		
				35	V, XIX		
19	XIV, XIX	10	XIV, III	39D	XIV, XVI		
20	XIV, Uncl. 28	11	XIV, XIX				
23	XIV, XX						
36	XIV, VI						
37D	XIV, IX						
38	XIV, III						
25	XXII, XXIII, XXIX	40	XXII, Uncl.	12	XXII, III, XIII		
32	XXII, XIII			24	XXII, III		
5D	VII, IX, Uncl. 32			13	XII, VIII		
14	XVII, XIX						
41	IV, XVIII	15	VI, Uncl. 29	45	XI, XV	46	XI, XXX, Uncl. 32
42	VI, Uncl. 32						
43	VI, Uncl. 32						
44	IX, Uncl. 32						
16	XVIII, IV, XIX						
17	XXX, XXVIII						
33	XXXI, Uncl. 32						
		47	III, Uncl. 29				
26	Uncl. 28, XIX						

* Roman numerals in the body of all tables represent types of pneumococcus. Case numbers refer to table 3, where results from cultures are given in detail. D in this and tables 2 and 3 indicates patients who died.

TABLE 2.—*Patients with Lobar Pneumonia Yielding a Single Type of Pneumococcus*

Type	Total Cases	Single Swab	Repeated Swabs: 1st Only	Repeated Swabs: 2d Only	Repeated Swabs: Recurrent	Other Source
I	18	11	...	1	5	ID, PMPL (2, pleura)*
V	4	1	...	...	3	
XIV	19	7	3	1	8	(ID, pleura, pericardium)
XXII	6	3	...	3	...	(ID, PMPL)
II	3	1	...	1	1	
X	2	1	...	1		
XVII	1	1				
IV	2	1	...	...	1	
VI	5	2	1	2		
IX	1	..	...	1		
XI	3	2	1†			
XVIII	2	2				
XXIII	2	1	1†			
XXIX	2	2				
XXX	1D	1				
XIX	2	..	1‡	1		
Unclassified	5	2	...	2‡	1	
Total	78	38	7	13	19	1 (4)
No pneumococcus §	13	11	...	...	2‡	

* Figures in parentheses represent evidence from another source which confirmed results from cultures of material from the throat.
† Second culture was contaminated.
‡ Figure includes one case in which the second culture was made after crisis.
§ These cases do not appear elsewhere in tables. PMPL signifies postmortem puncture of lung.

Recurrence of a single type in repeated cultures made during the active stages of pneumonia and repeated failure to recover types obviously possess diagnostic significance greater than less consistent results. A single type of pneumococcus was recovered in 78 cases (table 2), in 5 of which exudates obtained from other sources than the throat showed the same type. Repeated cultures were made in each of 39 cases, in 26 of which the first swab yielded a type which recurred subsequently in 19 instances. In 39 cases only one culture was performed, but in the absence of contradictory evidence all single types have been called causative.

More than one type of pneumococcus was recovered in 47 cases (table 3). Probably causative types were selected in 17 cases on the basis of evidence from other exudates or recurrence of only one type in material from the throat. Type I, V, XIV or XXII was recovered in 21 of the remaining 30 cases. These types were recovered from other sources than the throat and were obtained as single types or from consecutive cultures of material from the throat during acute pneumonia in more cases in which they appeared than were any of the accompanying types (tables 2 and 3). Many of the latter failed to appear alone, and none were recovered from other pathologic exudates. Thus, the available evidence favored selection of types I, V, XIV and XXII as probably causative in all cases of lobar pneumonia in which they were recovered.

There remained 9 cases in which only one culture was made during the active stage of pneumonia, and in 7 of these an unclassified strain accompanied the fixed type. In view of the observation that unclassified strains were found more often associated with fixed types than alone on repeated examination (tables 2 and 3), the fixed types seemed to merit etiologic preference in 6 of these cases (33, 42, 43, 44, 46 and 47 in table 3). In case 26 an unclassified pneumococcus was found in repeated cultures and predominated over the associated type XIX in cultures from the first swab. As type XIX has given little evidence of its causative relation to lobar pneumonia, the weight of evidence here appears to favor choice of the unclassified strain, although this conclusion was reached with some reservations. Predominance favored selection of type IV in case 41, and type XI has been more often causative than types XV and XXX (cases 45 and 46).

Since the acceptability of the final figures is governed entirely by the closeness with which they approach the facts, an effort has been made to reduce to a minimum the margin of error in selecting causative types from cultures of material from the throat within the very obvious limitations of the method. The presence of a single type of pneumococcus, especially when it occurred in repeated cultures of material from the throat or of other exudate, was accepted as evidence that it

TABLE 3.—*Patients with Lobar Pneumonia Yielding More Than One Type of Pneumococcus*

Case Nos.	Swabs 1st	2d	3d	4th	Other Source
1	I	IV	I, III	.....	(I, pleura)
2	V, VIII	XXX	V	.....	(V, pleura)
3D	IV, XIX	IV	.....	.....	(V, blood, pleura)
4D	V, XVIII	V, XVIII	XVIII	XVIII	(V, serum, XVIII, PMPL)
5D	Uncl. 20	VII	Uncl. 32	IX	(VII, pleura)
		Single Types Recurred in Cultures of Material from the Throat			
6D	I	I, XXXI	I		
7D	I	I	I, Uncl. 32		
8	V	V, VIII	V		
9	V, VI, III	V			
10	XIV	XIV	XIV, III		
11	XIV, XIX	XIV			
12	XXII, III, XIII	XXII			
13	XII, VIII	XII			
14	XVII	XVII, XIX	No pneumococcus		
15	VI, Uncl. 29	VI			
16	XVIII	XVIII, IV, XIX			
17	XXX	XXX, XXVIII			
18	V, XIII	XIII, Uncl. 32			
19	XIV, XIX	XIX			
20	XIV, Uncl. 28	Uncl.			
		More Than One Type Recurred in Cultures of Material from the Throat			
21	XXIII, XIX	I, XXIII, XIX	I, XIX	I	
22	V, VIII	V, VIII			
23	XX	XIV, XX	XIV, XX		
24	XXII, III	XXII, III			
25	XXIII, XXIX	XXII	XXIII, XXIX*		
26	Uncl. 28, XIX	Uncl., XIX			
		Second Cultures Yielded Different Types			
27	I, XI	XIII	No pneumococcus †		
28	VI*	No type †	I, Uncl. 32		
29	V	IV			
30	VI, XXX	V			
31	XXVIII	V			
32	XXII	XIII †			
33	XXXI	Uncl. 32			
		Single Cultures Were Positive			
34	I, XIX				
35	V, XIX				
36	XIV, VI				
37D	XIV, IX				
38	XIV, III				
39D	XIV, XVI				
40	XXII, Uncl. 32				
41	IV, XVIII	No pneumococcus			
42	VI, Uncl. 32				
43	VI, Uncl. 32				
44	IX, Uncl. 32				
45	XI, XV	No pneumococcus			
46	XI, XXX, Uncl. 32				
47	III, Uncl. 29				

Black face type indicates type considered causative.

Underscoring indicates cultures taken within five days after crisis, except in case 4, which terminated fatally four weeks after crisis, and case 26, the second culture of which was obtained ten days after the crisis.

Cultures in parentheses represent results from other source which confirmed results of swabs of the throat.

* Culture inoculated late.

† Culture contaminated.

was probably the causative type. Selection in cases in which more than one type appeared has been based, when possible, on recovery of a type from other sources than the throat. It was usually determined, however, by the relative frequency with which recovered types in the cases studied have been observed (1) to appear in other exudates than material from the throat, (2) to occur alone and (3) to recur in repeated cultures.

TABLE 4.—*Etiologic Grouping of Types Recovered from 125 Children with Lobar Pneumonia* *

Type	Incidence	Probably Causative	Probably Not Causative
I	25	25	
V	15	15	
XIV	28	28	
XXII	11	11	
II	3	3	
VII	1	1	
X	2	2	
XII	1	1	
XVII	2	2	
A strains	88	88	
Cases	88		
IV	7	3	4
VI	12	8	4
IX	4	2	2
XI	6	5	1
XVIII	5	3	2
XXIII	4	2	2
XXIX	3	2	1
XXX	5	2	3
XXXI	2	1	1
B strains	48	28	20
Cases	43		
III	7	1	6
VIII	4	..	4
XIII	4	..	4
XV	1	..	1
XVI	1	..	1
XIX	11	2	9
XX	1	..	1
XXVIII	2	..	2
C strains	31	3	28
Cases	30		
Unclassified	19	6	13

* Type XXVI (VI B) is included with type VI.

DIFFERENTIATION OF RECOVERED PNEUMOCOCCI INTO ETIOLOGIC GROUPS

Table 4 shows the numerical incidence of types recovered from 125 children with lobar pneumonia and the incidence of probably causative types. The etiologic status of types is not fully expressed in a picture of incidence, since types recovered from cultures of material from the throat were not always held responsible for the accompanying pneumonia. By comparing the numerical with the probably causative

frequency of recovered types, groups of pneumococci have been distinguished the constituent types of which differed on the basis of their apparent etiologic significance. While certain types (group A) appeared to be causative on relatively good evidence whenever they were present, others (group B) were possibly causative in about two thirds of the patients from whom they were recovered, and for others (group C), even though they were present in the throat in comparable proportions, further evidence was lacking that they bore an etiologic relation to the disease.

Group A includes types I, V, XIV and XXII, which were found in relatively high proportions, and the less common types II, VII, X, XII and XVII. These pneumococci have been set apart by the fact that the available evidence favored their selection as probably causative in all cases (88) of lobar pneumonia in which they were recovered. All pneumococci obtained from other sources than the throat appear in this group. From 53 of the patients yielding these types no other pneumococcus was recovered. In 10 of the 11 fatal cases pneumococci of this group were present (tables 1, 2 and 3), and in nearly half of the patients having lobar pneumonia during the first year of life and yielding A types the disease terminated fatally.

Group B includes types IV, VI, IX, XI, XVIII, XXIII, XXIX, XXX and XXXI. These types appeared to be causative in the development of the disease in 28 of the 43 children with lobar pneumonia from whom they were recovered. The available evidence was restricted to their recovery in cases in which A types did not appear. Type VI (VI*A* and *B*) was the most frequently recovered of these (12 cases). This organism, typical of the group as a whole, was occasionally accompanied by an A type (cases 9, 28, 30 and 36). B types were recovered only from swabs of the throat. From 18 of the patients yielding these types no other pneumococcus was recovered. One death occurred among the 6 infants under 1 year of age in whom B types may have been causative. The pneumococcus recovered in that case was type XXX.

Group C includes types III, VIII, XIII, XV, XVI, XIX, XX and XXVIII. These types were possibly causative in the development of the disease in only 3 of the children with lobar pneumonia who yielded them. Type XIX occurred alone in 2 cases, but in the remaining 28 cases in which C types appeared, other pneumococci were also recovered and in 27 of these the available evidence gave etiologic preference to the other organisms. Type III was selected in case 47 on the basis of a single swab from one patient who had been continuously ill since having whooping cough four months before admission. Type XIX was not uncommon in the throats of children with lobar pneumonia (11 cases), nor was type III (7 cases), but evidence that these organisms

produced the associated pneumonia was equivocal at best, since they were recovered only from material from the throat in cases in which only one swab was made during the active disease.

Types XXI, XXIV, XXV, XXVII, and XXXII were not found in cultures from the patients under consideration.

VALUE OF REPEATED CULTURES OF MATERIAL FROM THE THROAT

Pneumococci did not appear on the first culture in 20 cases in which repeated cultures were made, but they were subsequently recovered in 18 of these. In 50 of the 61 cases in which only one swab was made, pneumococci appeared, as against 75 of the 77 cases in which repeated examinations were performed.

Pneumococci of group A appeared in subsequent cultures from one third of the patients in whose cultures only B types had previously appeared and in an even higher proportion of those whose first cultures yielded a C type. They recurred in subsequent cultures in 75 per cent of the cases in which A types had appeared previously. On the other hand, pneumococci of groups B and C persisted in subsequent cultures in only about a third of the cases in which these types had been yielded. Cases 3, 18, 19 and 25 were the only ones in which B and C types recurred in material from the throat while previously recovered A types did not recur, and in cases 19 and 25 the second cultures were made after the crisis.

The incidence of A types in cases in which culture was repeated was considerably higher than in cases in which a single culture was performed, although the proportion of B types was nearly the same in the two groups of cases. Any significant error in the actual findings appears, therefore, to have been in the direction of revealing less than the full number of A types, already frequent, rather than in failing to show the incidence of B types. The usefulness of repeated culture in revealing probably causative A types is evident. C types also occurred more frequently in cases in which culture was repeated, but, since other evidence was lacking that these types were causative, the higher incidence in such cases served merely to emphasize their etiologic inferiority.

In revealing the causative organism, it is clear that repeated culturing is indicated during the active pneumonia, when pneumococci fail to appear on the first swab. Of no less importance is the repetition of culturing when the original swab carries pneumococci of groups B and C. Recovery of types which have been included in group A from the throats of children with lobar pneumonia may justifiably be accepted as strong evidence that these organisms played a significant part in causing the disease, since these types were commonly recovered from

other exudates, often occurred alone and usually recurred in repeated cultures. Failure to obtain these types on repeated attempts from patients yielding B types is of value as supportive evidence that the latter organisms have a causative significance. Recovery of C types from the throat is not credible evidence of the derivation of these pneumococci from the lung, since in the present series they did not appear in other exudates and were rarely unaccompanied by other types in cases in which repeated cultures were made.

Repeated cultures of material from the throat were accordingly useful in revealing the probably causative type and in confirming or modifying evidence previously obtained.

TABLE 5.—*Pneumococci Recovered from 82 Patients Without Pneumonia*

Type	Incidence		Type	Incidence	
I	1		III	3	
XIV	5		VIII	2	
XXII	2		XIII	1	
II	1		XV	4	
XVII	1		XIX	3	
A strains	10		XXVIII	1	
Cases		9	C strains	14	
IV	1		Cases		13
VI	7		XXI	1	
IX	3		Unclassified	5	
XI	3		No pneumococcus	32	
XVIII	8				
XXIII	1				
XXIX	2				
XXX	2				
XXI	1				
B strains	28				
Cases		27			

INCIDENCE OF PNEUMOCOCCI IN HOSPITALIZED PATIENTS

Table 4 has been referred to as showing the incidence of pneumococci in 125 children with lobar pneumonia. A types were found in 70.4 per cent of all cases, while B types appeared in 34.4 per cent and C types in 24 per cent.

The incidence of pneumococci recovered from 82 patients with no evidence of pneumonia may be compared with the foregoing figures (table 5). Pneumococci were recovered from 50 of these children, of whom 18 per cent yielded A types, 54 per cent B types and 26 per cent C types. The proportion here is in marked contrast with that in patients with lobar pneumonia as regards A and B types, but the incidence of C types is comparable for both groups of patients yielding pneumococci.

These observations indicate a high correlation between the presence of A types and lobar pneumonia in children. B types, although

apparently competent to produce the disease in some cases, were nevertheless often associated with other forms of illness. C types consistently failed to exhibit any specific predilection for lobar pneumonia and were recovered indifferently from patients with or without the disease.

The distribution of hemolytic streptococci among all patients and the members of their families did not suggest that the organisms were directly related to the pathogenesis of lobar pneumonia. They were recovered from the throats of slightly more than a third of the patients, whether pneumonia was present or not, and from a similar proportion of the persons with whom they came in contact. They did not appear in other exudates. They will not be considered further in this report.

DISTRIBUTION OF PNEUMOCOCCI IN FAMILIES

Analysis of epidemiologic factors in the families who were the objects of this study has been given added direction and simplicity by

TABLE 6.—*Relation of Age to Occurrence of Lobar Pneumonia in 107 Families*

	Patients			Younger Exposed Persons			Older Exposed Persons			
Number of Families	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over
26	4	7	18	14	16	7	0	6 (2)	18 (1)	82
81	43	24	16	0	0	0	2	50 (1)	64 (1)	197 (1)
Total 107	112			37			419 (6)			

Figures in parentheses represent older exposed persons who also had lobar pneumonia. Of 12 patients in 6 families, for 1 no culture was made, and another showed no pneumococci. These patients will not be considered in subsequent tables.

Of the other exposed persons included in this table, for 165 no culture was made. These will not be considered further in this report.

the reduction of an unwieldy and heterogeneous assortment of potential pathogens to three well demarcated etiologic groups. The remainder of this report will be devoted to consideration of relations between the groups of pneumococci which have been defined, the familial distribution of types, the age of infected persons, the occurrence of lobar pneumonia and the presence of the same type of organism in more than one member of a family as evidence of dissemination by contact. The incidence and the possible significance of colds in these families are to be considered in another report.

A relation of age to the occurrence of lobar pneumonia in 107 families is implicit in the fact that this disease was usually present in the youngest member of the family (table 6). The same observation has been reported by other investigators.[10] In only 8 families was more than one exposed person younger than the youngest patient.

The distribution of types in these families is recorded in table 7, which shows the incidence of pneumococci in 402 persons examined

bacteriologically. Table 8 expresses the incidence of groups of pneumococci on a percentage basis. Both tables are subdivided according to age, and patients are separated from exposed persons. Examination of these tables reveals that the familial distribution of pneumococci varied with age and with the occurrence of lobar pneumonia and that the groups of pneumococci retained their integrity with respect to these factors.

The incidence of A and B types was highest in infancy, and A types were recovered more frequently than were B types from both patients and exposed persons in the group below 12 years of age. While A types were more common throughout childhood in patients than in exposed persons, the incidence of B types in patients of school age was comparable with the incidence of these types in exposed persons. The incidence of C types did not vary significantly with age or with disease, except for the fact that these types were most common in children of 6 and 7 years who had pneumonia ascribed to other types. Exposed persons of 12 years and over carried types from all groups with practically identical frequency, and in them the incidence of B and C types was similar to that in younger exposed persons.

It has been suggested that carriers of pneumococci are infected "in the sense that the organisms are growing in their nasopharyngeal tissues." [17] Table 9 indicates that in the families under observation the group of the infecting pneumococcus and the age of the host were significantly related to the occurrence of lobar pneumonia in infected persons. It shows the proportion of children yielding pneumococci of each group who had lobar pneumonia ascribed to the respective organisms.

Lobar pneumonia occurred with the greatest frequency in children under 2 years of age, of whom nearly all with A types had this disease, although less than half of those with B types had pneumonia ascribed to them. Pneumonia was still relatively frequent among school children infected with A types, but B types appeared to produce the disease only half as often in infected school children as in infected infants. The proportion of C types associated etiologically with pneumonia in these families was practically negligible. Furthermore, in families of patients without pneumonia, infants yielded no A types, in contrast to B and C types, which were relatively common in infants (table 13).

These data emphasize the particularly high correlation already recognized between infection with A types and lobar pneumonia in

17. Webster, L. T., and Hughes, T. P.: Epidemiology of Pneumococcus Infection: Incidence and Spread of Pneumococci in Nasal Passages and Throats of Healthy Persons, J. Exper. Med. **53**:535 (April) 1931.

TABLE 7.—*Distribution of Pneumococci in 107 Families*

A. Incidence in Patients of Probably Causative Types

Type	Less Than 1 Yr.	1 Yr.	2 Yrs.	3 Yrs.	4 Yrs.	5 Yrs.	6 Yrs.	7 Yrs.	8 Yrs.	9 Yrs.	10 Yrs.	11 Yrs.	12 Yrs. and Over	Total
I	1	5	2	2	1	3	2	3	5	..	..	..	1	25
V	2	2	..	..	..	..	4	4	..	2	..	..	..	14
XIV	7	10	1	4	..	..	..	..	..	..	..	..	..	22
XXII	2	2	3	..	..	1	2	1	..	..	..	..	..	11
II	..	..	..	..	1	..	..	..	..	..	..	2	..	3
VII	1	..	..	..	..	..	..	..	..	..	..	..	..	1
X	1	..	..	..	..	1	..	..	..	..	..	..	..	2
XII	..	..	..	..	..	..	..	1	..	..	..	..	..	1
XVII	..	..	1	..	..	..	..	..	..	..	..	1	..	2
Group A														81
IV	1	1	..	..	1	..	..	..	..	..	..	..	..	3
VI	1	1	1	1	..	2	..	..	..	..	..	..	..	6
IX	..	..	..	..	1	..	..	..	..	..	..	..	..	1
XI	..	1	..	..	2	..	1	..	..	..	1	..	..	5
XVIII	..	1	..	..	..	..	..	1	..	..	..	..	..	2
XXIII	1	..	1	..	..	..	..	..	..	..	..	..	..	2
XXIX	..	..	..	..	..	..	..	..	..	1	..	1	..	2
XXX	1	..	..	..	..	..	..	..	..	..	..	..	..	1
XXXI	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Group B														23
III	..	..	..	..	..	1	..	..	..	..	..	..	..	1
VIII	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIII	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XV	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XVI	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIX	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XX	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XXVIII	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Group C														1
Unclassified	..	5	..	..	..	..	1	..	..	..	..	..	..	6
Total cases	19	28	9	7	6	8	10	10	5	3	1	4	1	111

B. Incidence in Patients of Types Probably Not Causative

Type	Less Than 1 Yr.	1 Yr.	2 Yrs.	3 Yrs.	4 Yrs.	5 Yrs.	6 Yrs.	7 Yrs.	8 Yrs.	9 Yrs.	10 Yrs.	11 Yrs.	12 Yrs. and Over	Total
IV	1	1	..	..	1	..	..	1	..	..	..	..	..	4
VI	..	2	1	..	..	..	..	1	..	..	..	..	..	4
IX	2	..	..	..	..	..	..	..	..	..	..	..	..	2
XI	..	1	..	..	..	..	..	..	..	..	..	..	..	1
XVIII	1	1	..	..	..	..	..	..	..	..	..	..	..	2
XXIII	..	1	1	..	..	..	..	..	..	..	..	..	..	2
XXIX	..	..	1	..	..	..	..	..	..	..	..	..	..	1
XXX	..	1	..	..	..	..	1	..	..	..	1	..	..	3
XXXI	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Group B														20
III	..	1	..	1	1	..	1	2	..	..	..	..	..	6
VIII	..	..	..	..	..	..	2	1	..	1	..	..	..	4
XIII	..	1	1	..	..	..	2	..	..	..	..	..	..	4
XV	..	..	..	..	..	..	1	..	..	..	..	..	..	1
XVI	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIX	1	4	1	1	..	..	1	1	..	..	..	..	..	9
XX	1	..	..	..	..	..	..	..	..	..	..	..	..	1
XXVIII	1	..	..	..	..	..	1	..	..	..	..	..	..	2
Group C														27
Unclassified	3	..	1	1	..	2	1	..	..	..	1	..	..	9
Total cases	10	11	5	3	1	2	8	5	..	1	1	..	..	47

TABLE 7.—*Distribution of Pneumococci in 107 Families—Continued*

C. Incidence of Pneumococci in Exposed Persons

Type	Less Than 1 Yr.	1 Yr.	2 Yrs.	3 Yrs.	4 Yrs.	5 Yrs.	6 Yrs.	7 Yrs.	8 Yrs.	9 Yrs.	10 Yrs.	11 Yrs.	12 Yrs. and Over	Total
I	1	..	1	4	3	2	2	2	..	..	..	1	14	30
		(1)		(1)	(1)								(1)	(4)
V	..	..	..	..	..	..	1	1	..	..	1	..	4	7
XIV	..	..	1	1	3	1	..	..	1	..	1	..	8	16
		(1)		(1)										(2)
XXII	..	..	..	..	..	1	1	1	..	..	..	1	5	9
			(1)				(1)							(2)
II	..	..	..	..	..	..	..	..	..	..	..	..	4	4
VII	1	..	..	..	..	1	..	..	..	..	..	..	1	3
X	..	..	1	..	..	..	..	..	1	1	..	..	4	7
XII	..	..	..	..	..	..	..	..	1	..	..	..	3	4
XVII	..	..	..	..	..	..	..	1	1	..	..	..	..	2
Group A														82
														(8)
IV	..	..	..	1	..	..	2	..	1	..	..	..	5	9
VI	..	..	2	..	1	..	4	..	..	..	..	..	11	18
IX	..	..	..	..	..	..	..	..	..	..	..	..	5	5
XI	..	..	1	..	1	1	..	..	..	1	1	..	9	14
XVIII	..	..	2	..	..	..	..	1	1	..	..	..	3	7
XXIII	..	..	..	..	..	..	1	..	..	..	..	..	..	1
XXIX	..	..	..	..	..	..	..	..	..	..	..	1	5	6
XXX	..	..	..	..	1	..	..	..	..	..	..	..	2	3
XXXI	..	..	..	..	1	..	..	..	..	..	..	..	..	1
Group B														64
III	..	..	..	..	..	1	..	..	..	..	..	..	12	13
							(1)							(1)
VIII	..	..	..	..	..	..	1	..	..	1	..	..	7	9
XIII	..	..	1	..	..	..	..	1	..	..	..	1	3	6
			(1)				(1)							(2)
XV	..	..	..	1	1	..	..	..	..	..	..	..	3	5
XVI	..	..	1	..	..	..	..	..	..	1	..	..	3	5
XIX	..	1	1	2	1	1	..	1	..	..	2	..	7	16
				(1)										(1)
XX	..	..	1	..	2	..	..	..	..	1	..	1	4	9
XXVIII	..	..	..	..	..	..	..	..	..	..	..	..	2	2
Group C														65
														(4)
XXI	..	..	..	..	..	..	..	..	..	..	..	..	1	1
XXIV	..	..	..	1	..	..	..	..	..	..	..	..	2	3
XXVII	..	..	..	..	..	.	..	..	..	..	..	..	1	1
XXXII	..	..	..	..	..	..	..	..	..	..	..	..	2	2
Uncl. only	..	1	1	1	..	1	1	..	..	..	1	..	9	15
No pneumococcus	1	1	3	2	3	4	3	4	2	2	2	2	60	89
Total examined	3	3	12	12	16	13	14	11	6	6	8	7	180	291
		(2)	(1)	(2)	(1)		(1)						(1)	(8)

Figures in parentheses represent exposed persons who also had lobar pneumonia.

Vertical and horizontal totals are not identical in parts B and C, since some patients yielded more than one noncausative strain.

children and reveal that the correlation is highest in infants. Although B types appeared to produce pneumonia with considerable frequency among infected infants, they were comparatively inactive among school children. The youth of the patients suffering from pneumonia in these families thus appears to depend on the fact that young persons, who most often yielded A and B pneumococci, were also most susceptible to lobar pneumonia.

TABLE 8.—*Percentage of Patients and Exposed Persons in Whom Pneumococci of Various Groups Appear (107 Families)*

	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over	Total
A Types					
Patients	70.2	66.6	81.8	....	72.7
Exposed persons	33.3	35.8	34.6	23.9	28.1
B Types					
Patients	44.6	43.3	27.2	....	39.0
Exposed persons	0.0	20.7	24.0	22.2	21.9
C Types					
Patients	19.1	20.0	39.3	....	25.4
Exposed persons	16.6	26.4	19.2	22.7	22.2

This table shows that the familial distribution of pneumococci varied with age and the occurrence of lobar pneumonia and that these factors were in consistent relation to the groups of pneumococci.

TABLE 9.—*Percentage of Infected Persons Contracting Lobar Pneumonia*

	Children with Pneumonia Ascribed to Infecting Pneumococcus		
	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.
Group A	94.2	51.2	60.0
Group B	42.8	37.5	23.8
Group C	0.0	5.2	0.0

Lobar pneumonia occurred with the greatest frequency in infected infants. The simultaneous occurrence of pneumococcic infection and lobar pneumonia grew less common as age increased, particularly for B types, which were not at any age so regularly responsible for the disease as A types. C types were rarely responsible for lobar pneumonia in infected persons of any age.

Tables 8 and 9 have been derived by condensation from table 7.

The group of infecting pneumococcus was also related to the simultaneous incidence of types recovered from patients with pneumonia among the persons with whom they came in contact. In table 10 are again recorded the types recovered from 402 persons, of whom 110 children and 1 adult had lobar pneumonia. Each of 4 families included 2 patients with lobar pneumonia, all showing A types, and in these families both patients yielded the same type. A types recovered from exposed persons were usually identical with those found in patients of the same families—a point of contrast between group A and the others, which accounts for the high incidence of A types among exposed persons, as compared with pneumococci of groups B and C.

A types invariably seemed to be causative in those patients with pneumonia from whom they were recovered, and they readily assumed epidemic proportions in the families of such patients and were occasionally responsible for multiple familial cases of lobar pneumonia. B types found in patients were not always causative. When recovered from exposed persons, these types were not usually identical with those recovered from the corresponding patients. However, the incidence of B types among exposed persons, as in patients without pneumonia, was

TABLE 10.—*Relation of Groups of Pneumococcus to Simultaneous Incidence of Types in Patients and Persons with Whom They Came in Contact*

Type	Patients	Exposed Persons Relation to Patient's Type		Total Strains
		Identical	Different	
I	25	23 (4)	7	55
V	14	3	4	21
XIV	22	13 (2)	3	38
XXII	11	6 (2)	3	20
II	3	..	4	7
VII	1	..	3	4
X	2	3	4	9
XII	1	..	4	5
XVII	2	..	2	4
A strains	81	48 (8)	34	163
IV	7	2	7	16
VI	10	8	10	28
IX	3	2	3	8
XI	6	1	13	20
XVIII	4	2	5	11
XXIII	4	1	0	5
XXIX	3	2	4	9
XXX	4	..	3	7
XXXI	2	..	1	3
B strains	43	18	46	107
III	7	1	12 (1)	20
VIII	4	1	8	13
XIII	4	1 (2)	5	10
XV	1	..	5	6
XVI	0	..	5	5
XIX	9	2	14 (1)	25
XX	1	..	9	10
XXVIII	2	..	2	4
C strains	28	5 (2)	60 (2)	93

Figures in parentheses represent exposed persons who were also patients.

higher than the incidence of causative B types in patients with pneumonia. The etiologic significance of C types appeared to be greatly inferior to that of pneumococci of groups A and B, yet they occurred in exposed persons as often as did B types, although the same C types were even less frequently recovered from patients and exposed members of one family.

If the presence in a family of more than one person with the same type of pneumococcus is considered an index of dissemination of that organism by contact, then in attempting to discern factors underlying such transmission it is obvious that the most accurate observations will

be made in families from which the highest proportion of exposed persons were available for culture. One half or more of the members of 77 families (329 persons) were examined. In these families 41 per cent of the persons examined yielded types which were simultaneously found in other members of the same family. In 30 families of whose members less than half (73 persons) were available for bacteriologic study, the corresponding figure was 16.4 per cent. For the purposes of the following observations, therefore, only the former group of families will be considered.

Most families included persons who carried other types of pneumococcus than those considered responsible for the concurrent

TABLE 11.—*Familial Distribution of Types to Which Concurrent Pneumonia Was Ascribed*

(74* Families)

	Families in Which Causative Types Occurred Also in Exposed Persons — Age				Families in Which Causative Types Occurred Only in Patients — Age			
	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over
A types:	30 Families				26 Families			
Patients: A strains	17	9	7	1	9	7	10	0
Exposed persons examined	3 (2)	25 (3)	25 (1)	61 (1)	2	7	12	50
Causative A strains recovered	1 (2)	14 (3)	11 (1)	18 (1)	0	0	0	0
B types:	6 Families				12 Families			
Patients: B strains	2	2	2	0	5	5	2	0
Exposed persons examined	0	4	6	17	0	6	4	20
Causative B strains recovered	0	2	1	7	0	0	0	0

* Figure excludes 3 families in which the patients yielded only unclassified pneumococci. Figures in parentheses represent exposed persons who also had lobar pneumonia.

pneumonia. In many families the causative type occurred simultaneously in the patient and in one or more of the persons with whom he came in contact. Likewise, types which were not etiologically related to the concurrent pneumonia were occasionally recovered from several persons. Table 11 indicates the familial distribution of all fixed types to which the concurrent pneumonia was ascribed. Table 12 shows the distribution of those fixed types not considered responsible for the concurrent pneumonia. Table 13 is a record of the distribution of pneumococci in families having no evidence of pneumonia.

These tables reveal that infection of more than one person with the same A types occurred usually in those families in which the patients had lobar pneumonia ascribed to the epidemic types. Familial epidemics of A strains were rare in families without pneumonia or in those in which the pneumonia was ascribed to other types. It is evident that the occurrence of pneumonia bore some relation to the

presence of the causative type in persons in immediate contact with the patient, and the question arises whether pneumonia was in fact contributory to its dissemination. Since investigation of the family always followed the admission of the patient to the hospital, it is not possible to answer this question by bacteriologic analysis of consecutive events in individual families. However, nearly half of the patients with pneumonia due to A types came from families in which the causative types did not simultaneously appear in other members (table 11). Evidence is lacking that in these families pneumonia either contributed to or was consequent on familial epidemics of pneumococci.

The presence of pneumococci of group A in infants and young children has been shown to have a high correlation with the occurrence

TABLE 12.—*Familial Distribution of Types to Which Concurrent Pneumonia Was Not Ascribed*

(77 Families)

	Families in Which Noncausative Types Occurred in More Than One Member				Families in Which Noncausative Types Occurred in One Member Only			
	Age				Age			
	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over
A types:	3 Families				19 Families			
Persons examined	3	8	4	7	8	17	20	50
Noncausative A strains recovered	1	2	0	4	0	3	5	15
B types:	8 Families				33 Families			
Persons examined	6	11	13	23	17	30	34	70
Noncausative B strains recovered	3	3	6	8	8	8	7	18
C types:	9 Families				43 Families			
Persons examined	4	10	13	21	22	47	38	86
Noncausative C strains recovered	2	4	7	8	6	11	12	25

of lobar pneumonia. Families with epidemics of A strains included relatively larger numbers of children than families without such epidemics, and young exposed persons more often carried types concurrently found in patients than did adults (table 11). The latter carried most of the A strains which were not found concurrently in patients (tables 12 and 13). Evidently, therefore, youth was significantly related not only to the occurrence of lobar pneumonia in persons with A types but also to the infection of persons who came into immediate contact with patients yielding the causative types.

A types most often occurred in several members of a family when children were exposed to pneumonia ascribed to these types. Either families giving no evidence of dissemination of A types did not include patients with pneumonia ascribed to these types, or when such patients

were present there were relatively few young children exposed to the disease. When disease occurred in response to the infection of susceptible persons with A types, the young persons with whom they came in contact yielded the causative types in high degree. Accordingly, familial dissemination of A types was encouraged by the occurrence in infected persons of disease ascribed to the infecting types, and by the exposure of children to the disease.

The presence of lobar pneumonia ascribed to B types bore a similar relation to the familial distribution of these types but in lower degree. Pneumonia in which B types were causative was less often associated with familial epidemics of the causative types than was pneumonia due to A types. The same proportion of families in which

TABLE 13.—*Distribution of Types in 23* Families Giving no Evidence of Pneumonia*

	Families in Which Types Occurred in More Than One Member				Families in Which Types Occurred in One Member Only			
	Age				Age			
	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over	Less Than 2 Yrs.	2-5 Yrs.	6-11 Yrs.	12 Yrs. and Over
A types	No Families				6 Families			
Persons examined	..	..	..	..	3	6	4	10
A strains recovered	..	..	..	..	0	2	1	5
B types	7 Families				15 Families			
Persons examined	7	5	5	13	9	16	11	25
B strains recovered	4	4	1	8	3	7	2	6
C types	3 Families				14 Families			
Persons examined	2	2	8	9	10	10	11	24
C strains recovered	0	1	5	1	3	3	0	10

* Figure excludes 4 families (10 persons) yielding no pneumococci.

the patients had other infections than pneumonia showed dissemination of B strains. Children yielded B types found in other members of the same family somewhat more commonly than did adults, although the contrast in age was not so great as that for A types.

Pneumonia in these families was not ascribed to C types, which were accordingly distributed without regard to their etiologic association with the disease. These types were less often recovered from several members of the same family than were causative A and B types. Children carried most of the C types found simultaneously in more than one member of a family.

Types which were not considered responsible for the concurrent pneumonia were not usually found in more than one member of a family. Under these circumstances A types were least often, and B types most often, found in several members (tables 12 and 13).

The average number of persons in families with pneumococcic epidemics was larger, group for group, than that in households giving no evidence of such dissemination. Dissemination occurred in smaller families when pneumonia was ascribed to the epidemic type than when the epidemic type was not responsible for the concurrent pneumonia.

It has been shown that the group of the infecting pneumococcus and the age of the infected person are closely related to the occurrence of lobar pneumonia. Furthermore, the familial dissemination of pneumococci is related to the group of the infecting pneumococcus, the presence of disease ascribed to the infecting type, and the age and total number of persons with whom the patient comes in contact. Not only did young children suffer and die from lobar pneumonia, but they played a major part in the familial dissemination of pneumococci, especially of those types to which they were highly susceptible.

COMMENT

Since their original differentiation, it has been recognized that all types of pneumococcus are not equally significant in disease. The germane contribution of this study lies in the observation that such inequalities may represent a basis for the further differentiation of types into groups. The pertinence of the epidemiologic findings here reported derives from their relation to the proposed etiologic groups of types of pneumococcus. While the evidence is not adequate to warrant an assumption of finality for the grouping of rare types, its conclusiveness seems assured at least for those types most often associated with lobar pneumonia in childhood. The consistency with which the groups as constituted have retained their integrity in relation to the distribution of types, the occurrence of lobar pneumonia in persons infected with them and their familial dissemination support the impression that they have been segregated on valid grounds.

Infection of young persons with A types was accompanied by the maximal incidence of lobar pneumonia, which in the presence of children was associated with the maximal familial dissemination of types. By contrast, these types were rarely recovered from persons without pneumonia who had not been in close contact with patients yielding them. Other observers have reported pneumococcic epidemics which were associated with organisms of this group, and nearly all these types have been recovered in multiple familial cases of lobar pneumonia.

B types were less often responsible for lobar pneumonia in infected persons, even in infants, and they showed a corresponding limitation in the freedom with which they infected persons in immediate contact with patients whose pneumonia was ascribed to them. But they were commonly found in persons without pneumonia. Their etiologic efficacy

was further reduced as the age of carriers increased. However, the relative infrequency with which they appeared to be etiologically related to lobar pneumonia in infected persons was primarily associated with their inherent qualities, while increasing age of the host accentuated the dissociation between their general incidence and the occurrence of lobar pneumonia.

The capacity of C types to induce lobar pneumonia in children appeared lowest of all. Despite their frequency in the families studied, infection with these types was rarely accompanied by the development of this disease in persons of any age. Their familial dissemination was comparable with that of other pneumococci in families without pneumonia or in those in which pneumonia was ascribed to heterologous types. Included in this group are types (especially the common types III and XIX) which have been found by other observers to occur in "healthy" persons, in association with other varieties of disease or in association with lobar pneumonia under highly adverse circumstances.

The presence of A and B types and the development of lobar pneumonia ascribed to them were so closely related to age as to suggest their dependence on factors concerning the host, including the acquisition of specific resistance. Many pneumococci which appeared responsible for the disease in early life were little more significant in later life than the least active types, the importance of which was minimal throughout childhood. Resistance to C types usually sufficed to protect carriers against the development of lobar pneumonia.

The presence of pneumonia in an infected person was accompanied by increased incidence of the causative type of pneumococcus among those with whom he came in immediate contact. The significance of this relation may be sought in the factor of dosage, an increase in which has been observed to precede epidemics of pathogenic organisms in animals.[18] The resistance of exposed persons can be influenced in this way only by the transmission of infectious material. If it is assumed that the virulence of pathogenic organisms is constant under natural conditions, dosage remains the important epidemiologic factor which may thus be altered.

Epidemiologic interrelations which have been demonstrated in the families of children with lobar pneumonia conform closely to the classic interplay of virulence, as represented by the group of the pneumococci; the resistance of the host, exemplified by age, and dosage, so far as this has been expressed in terms of the relation of pneumonia to familial dissemination of the causative type. The observations of this study suggest that pneumococci are possessed of inherent factors which are not peculiar to their type but which provide the basis for their

18. Webster, L. T.: Experimental Epidemiology, Medicine **11**:321 (Sept.) 1932.

differentiation into groups and which, in conjunction with factors pertaining to host and dosage, limit the effective virulence of types. A grouping of hemolytic streptococci according to variations in the so-called C substance has been reported, and to this its authors [19] ascribe epidemiologic significance. Such investigations applied to pneumococci should help in an understanding of their pathogenic and epidemiologic characteristics.

The grouping of types of pneumococcus has immediate and practical, as well as theoretical, applications. In specific therapy the successful use of antiserums need be attempted for relatively few types in the hope of alleviating the course of most lobar pneumonia in childhood. The mortality of infants is so high as to make reduction by specific means well worth persistent study, and this requires precise identification of all types that are highly pathogenic for young children. Treatment of children with serum for the common types, I, XIV, V and VII, has been favorably reported.[20] Conversely, the preparation of therapeutic serums for many types for use in children with this disease appears to be without indication.

Protection of susceptible persons from infection with highly pathogenic types is of first importance in reducing not only the amount of disease but, even more happily, the number of fatalities. The observed relation of children to the dissemination of pneumococci has an inescapable bearing on the epidemiologic problem. If separated from carriers, especially from those with lobar pneumonia, such susceptible persons will avoid infection and subsequent disease and may be prevented from contributing to the further dissemination of pneumococci to susceptible persons with whom they come in contact. Patients with pneumonia merit respect as potential foci for the dissemination of dangerous and "parasitic" pneumococci. The contagious character of such infections has become increasingly apparent. The evidence indicates that a vigorous campaign of isolation or immunization against selected types of pneumococcus can be expected to effect a reduction in morbidity comparable to that achieved for other epidemic infections. Much confusion may be resolved by establishing cleanly the relative epidemicity of types of pneumococcus and their determining factors.

SUMMARY

Comparison of numerical with causative frequencies of types of pneumococcus which have been recovered from children with lobar

19. Swift, H. F.; Lancefield, R. C., and Goodner, K.: Serologic Classification of Hemolytic Streptococci in Relation to Epidemiologic Problems, Am. J. M. Sc. **190**:445 (Oct.) 1935.

20. Nemir, R. L.: (*a*) Treatment of Pneumonia in Infants and Children with Antipneumococcus Serum, J. Pediat. **3**:827 (Dec.) 1933; (*b*) in preparation.

pneumonia led to their separation into three etiologic groups, the distribution of which among patients with and without pneumonia and among other members of the same families indicated a corresponding diversity in their epidemiologic significance.

A types appeared causative in all patients with lobar pneumonia from whom they were recovered, and they were associated with a relatively high incidence of pneumonia in infected persons, high mortality among infants, marked evidence of familial dissemination when the concurrent pneumonia was ascribed to these types and relatively low incidence in families without pneumonia or in those in which the patients did not show the same types of pneumococcus.

Intermediate or B types appeared causative in many, but not all, of the children with lobar pneumonia from whom they were recovered but, in comparison with the former group, showed a lower incidence of this disease in infected persons, lower mortality among infants, less evidence of familial dissemination when the concurrent pneumonia was ascribed to these types and a relatively high incidence in families without pneumonia or in those in which the patients had pneumonia ascribed to heterologous types.

The least active types (group C) appeared to be responsible for lobar pneumonia in few of the children from whom they were recovered. Evidence for their familial dissemination was uncommon, but these were the types most often recovered from persons coming in contact with patients whose pneumonia was ascribed to heterologous types.

The incidence of pneumococci, the occurrence of lobar pneumonia in infected persons and the familial dissemination of causative types also varied with age.

Children exposed to pneumonia ascribed to A types yielded pneumococci found in the patients relatively more often than did adults.

Patients with pneumonia ascribed to A types constituted the most active sources of infection by contact.

Repeated cultures of material from the throat were helpful in revealing the probably causative types in children with lobar pneumonia.

Case Reports

SUBACUTE BACTERIAL ENDOCARDITIS DUE TO A HEMOLYTIC PARA-INFLUENZA BACILLUS

JOHN A. LICHTY JR., M.D.
ROCHESTER, N. Y.

Although it is well known that the influenza bacillus is the apparent etiologic agent in about 5 per cent of all cases of subacute bacterial endocarditis, comparatively few cases have been reported in which a hemolytic influenza bacillus was obtained from the blood cultures. This organism was first described in 1919, by Pritchett and Stillman,[1] who observed it in material from the throats of normal persons and suggested the name Bacillus X.

A case of subacute bacterial endocarditis due to this organism in a 14 year old boy is presented, with the results of clinical, postmortem and bacteriologic studies. For the sake of comparison, some of the data are grouped in table 1 with those in seven similar cases previously reported. The organisms from two of the patients were only slightly hemolytic, but they were studied in such detail that it seems advantageous to include the cases.

REPORT OF A CASE

History.—Charles S., a 14 year old white boy, was admitted to the Rochester Municipal Hospital on Sept. 19, 1936, with the complaint of weakness, loss of appetite, nervousness and fever of seven weeks' duration. In addition to the gradual onset of these symptoms, he had noted numbness and tingling of the left arm for two weeks and transient pains in the muscles and joints without redness or swelling. The fever was intermittent and was accompanied by some loss of weight. No symptoms indicating involvement of the upper part of the respiratory tract, the heart, the gastro-intestinal tract or the genito-urinary tract existed. The patient's past history and the family history were irrelevant.

Examination.—When the patient was admitted to the hospital the temperature was 39.5 C. (103.1 F.), the pulse rate 120, the respiratory rate 20 per minute and the blood pressure 114 systolic and 85 diastolic. The patient was well developed and well nourished; he appeared pale and sallow but showed no evidence of pain or discomfort. The pupils were slightly unequal in size but

From the Department of Pediatrics, University of Rochester School of Medicine and Dentistry, and the Strong Memorial and the Rochester Municipal Hospital.

1. Pritchett, I. W., and Stillman, E. G.: The Occurrence of Bacillus Influenzae in Throats and Saliva, J. Exper. Med. **29**:259, 1919.

TABLE 1.—*Comparison of Reported Cases of Subacute Bacterial Endocarditis Due to a Hemolytic Influenza Bacillus (A) Clinical Characteristics*

Authors	Miller and Branch*	Fothergill and Others†		De Santa and White‡	Fox§	Stuart-Harris and Others‖		Present Case
Age	12 years	11 years	13 years	32 years	40 years	28 years	44 years	14 years
A. Clinical Characteristics								
Sex of patient	Female	Male	Female	Female	Female	Female	Male	Male
History	? Heart disease	Rheumatic heart disease	Rheumatic heart disease	Heart disease	Heart disease	.....	.....	Not significant
Duration of illness	7 weeks	5½ weeks	7 weeks	5 weeks	5 weeks	7 months	5 months	10 weeks
Seasonal incidence	Autumn	.....	.....	Autumn	Autumn	.....	.....	Autumn
Symptoms at onset (in addition to fever)	Nausea, vomiting, chill	Arthralgia	.....	Chill and cough	Vomiting, diarrhea, pharyngitis	.....	.....	Weakness, anorexia, arthralgia
Number of positive blood cultures	3	4	2	1 (of 3)	4	4	4	5
Time necessary for growth	3-5 days	.....	.....	1 day	1 day	2-3 days	2-3 days	4-8 days
Confirmatory postmortem observations	Blood culture positive, bacilli in mitral vegetation	Bacilli in mitral vegetation (stain and culture)	No autopsy	Bacilli in endocardial vegetation and kidneys	Bacilli in mitral vegetation	Bacilli in endocardial vegetation	No autopsy	Bacilli in mitral vegetation
Associated organisms	.....	.....	.....	One blood culture had Streptococcus viridans	.....	.....	.....	One colony of Streptococcus viridans in 1 plate
B. Bacteriologic Characteristics								
Structure	Pleomorphic gram-negative bacillus	Pleomorphic gram-negative bacillus	Pleomorphic gram-negative bacillus	Gram-negative bacillus	Pleomorphic gram-negative bacillus	Gram-negative cocco-bacillus	Gram-negative cocco-bacillus	Short, thick gram-negative bacillus
Requirement for growth	Blood in the medium	Blood in the medium	Blood in the medium	Blood in the medium	V factor in the medium	V factor in the medium	V factor in the medium	V factor in the medium
Hemolysis	Beta type on plate but not in broth	Beta type	Beta type	Beta type	Beta type	Alpha type with horse's blood (transient)	Alpha type with horse's blood	Beta type with rabbit's blood, horse's blood and sheep's cells
Serologic reactions	Agglutination by patient's serum, 1:160	No agglutination by patient's serum	Agglutination by patient's serum, 1:20	.....	Agglutination by patient's serum, 1:320¶	Agglutination by patient's serum, 1:640	Agglutination by patient's serum, 1:640	Agglutination by influenza serum, 1:64; by Br. abortus serum, 1:128
Pathogenicity	Mice, none; guinea-pig, none	Mice, none; guinea-pig, none; rabbit, none	Mice, none; guinea-pig, none; rabbit, none	.....	Mice, none; guinea-pig, none; rabbit, none	Mice, none; guinea-pig, none	Mice, none; guinea-pig, none	Mice, slight; guinea-pig, none; rabbit, none
Classification by author	Hemolytic influenza bacillus	Hemolytic influenza bacillus	Hemolytic influenza bacillus	Hemolytic influenza bacillus	Hemolytic para-influenza bacillus	Para-influenza bacillus	Para-influenza bacillus	Hemolytic para-influenza bacillus

* Miller, C. D., and Branch, A.: Subacute Bacterial Endocarditis Due to an Hemolytic Hemophilic Bacillus, Arch. Int. Med. **32**: 911 (Dec.) 1923.
† Fothergill, L. D.; Sweet, M., and Hubbard, J.: The Hemolytic Hemophilic Bacillus ("Bacillus X") in Subacute Bacterial Endocarditis, J. Pediat. **1**: 692, 1932.
‡ De Santa, D. A., and White, M.: Hemophilus Hemolyticus Endocarditis, Am. J. Path. **9**: 381, 1933.
§ Fox, W. W.: Endocarditis Due to the Hemolytic Para-Influenza Bacillus, J. A. M. A. **105**: 870 (Sept. 14) 1935.
‖ Stuart-Harris and others.[9]

reacted to light. A slight mucopurulent discharge was present in the left nostril and in the nasopharynx. The lips were pale. The teeth showed some caries. The tonsils were moderately enlarged and injected. The cervical lymph nodes were slightly enlarged. The heart was slightly enlarged on the left, with a soft blowing systolic murmur at the apex, which was transmitted into the axilla. There was coarse tremor of the hands when they were extended. Other findings were normal.

Laboratory Data.—Urinalysis showed a 1+ reaction for albumin. A blood count showed red blood cells, 2,840,000; hemoglobin, 9.5 Gm. per hundred cubic centimeters; white blood cells, 32,000; polymorphonuclear leukocytes, 85 per cent; lymphocytes, 5 per cent, and monocytes, 10 per cent. The Wassermann test of the blood was negative. The nonprotein nitrogen content was 26 mg. per hundred cubic centimeters, the serum calcium content 10.8 mg. and the serum phosphorus content 4 mg. Dick and Schick tests and intradermal tests with human old tuberculin (with a dilution of 1:100) gave negative results. The bleeding time

TABLE 2.—*Organisms Observed by Culture of the Blood*

Date Blood Was Taken	Date of First Appearance of Growth	
	Broth	Poured Plate
9/19/36	9/23/36: Hemolytic influenza bacillus	No growth
9/21/36	No growth	9/23/36: 1 colony, Streptococcus viridans
9/23/36	9/28/36: Hemolytic influenza bacillus	9/29/36: Hemolytic influenza bacillus
9/28/36	No growth	No growth
10/ 1/36	No growth	10/ 9/36: Hemolytic influenza bacillus
10/ 4/36	No growth	No growth
10/ 6/36	No growth	10/12/36: 1 colony, hemolytic influenza bacillus
10/11/36	10/16/36: Hemolytic influenza bacillus	No growth

was one and one-half minutes, and the clotting time was three minutes (capillary tube). The electrocardiogram showed right axis deviation. A roentgenogram of the chest showed the size and the shape of the heart to be consistent with rheumatic heart disease. The sedimentation rate was 0.5 mm. in ten minutes (0.3 mm. was considered as the upper limit of normal). The patient's serum failed to agglutinate Brucella abortus, Brucella melitensis, Bacillus typhosus, Bacillus tularensis and Bacillus proteus X 19. It did agglutinate sheep cells in a titer of 1:32. A culture of material from the throat showed a hemolytic influenza bacillus.

Table 2 shows the results of the numerous cultures of the blood.

Course in the Hospital.—The temperature curve was "spiking," and from the fifth day numerous crops of petechiae occurred. On the sixth day hemiplegia of the left side was noted, and thereafter the patient was irrational much of the time. He received two transfusions, but in spite of these the anemia persisted, and the urine showed an increasing amount of albumin, with numerous white blood cells, red blood cells and casts. On Oct. 8, 1936, the nonprotein nitrogen content of the blood was 160 mg. per hundred cubic centimeters, and from that time on the course was one of rapidly developing uremia. An apical diastolic

murmur appeared, but there was only slight evidence of cardiac decompensation. The blood pressure did not become elevated. Death occurred on October 14.

Clinical Diagnosis.—The clinical diagnosis was subacute bacterial endocarditis (hemolytic para-influenza bacillus), acute hemorrhagic nephritis, uremia, hemiplegia of the left side, secondary anemia, chronic hypertrophic tonsillitis, nasopharyngitis (mild) and dental caries.

REPORT OF AUTOPSY

The autopsy was performed by Dr. C. C. Erickson, of the Department of Pathology, University of Rochester School of Medicine.

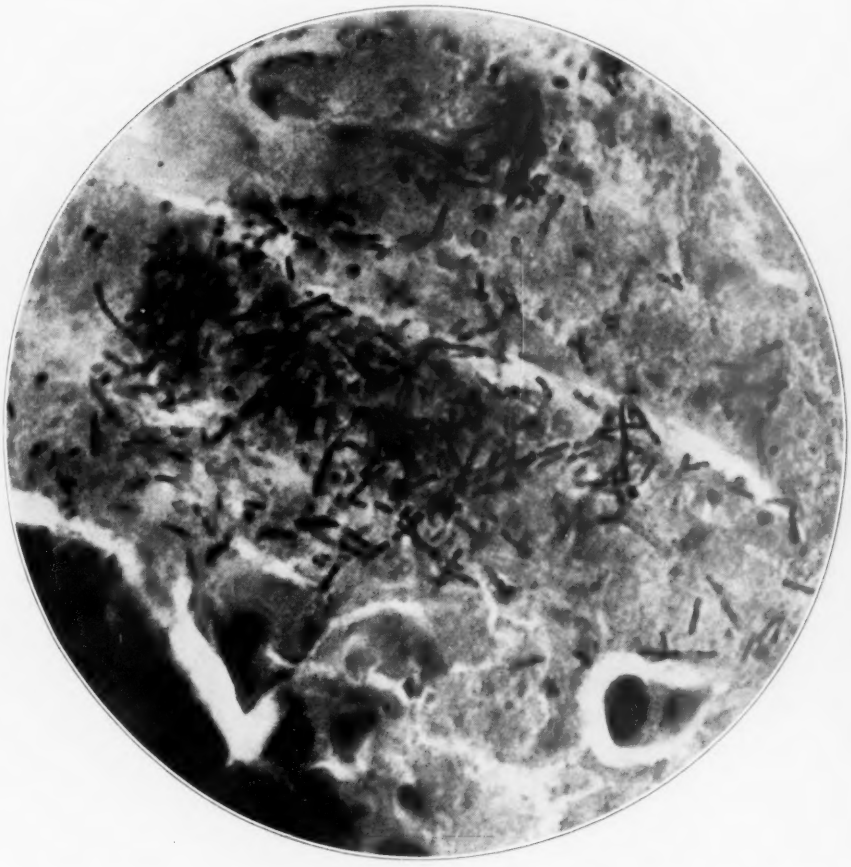
Anatomic Diagnosis.—The anatomic diagnosis was subacute bacterial endocarditis of the mitral and the aortic valves, multiple infected emboli of the heart, liver, spleen, kidneys and left common iliac artery, subacute myocarditis with multiple small infarcts, cardiac hypertrophy and dilatation, mural thrombi in the right auricle, pulmonary emboli, subacute glomerulonephritis, renal infarcts with abscess formation, foci of necrosis in the liver with multiple abscesses and organized perihepatitis, acute splenic tumor with infarcts of the spleen, pulmonary congestion and edema, acute bronchitis and bronchopneumonia, congestion and cloudy swelling of the viscera, periprostatic thrombosis, multiple petechiae of the skin, pleura, pericardium, peritoneum and the mucosa of the bladder, uremic frost over the face and the chest and dental caries. (Permission to examine the brain was not granted).

Pathologic Changes.—The details of the more pertinent pathologic changes are presented.

Heart: The heart weighed 350 Gm. The external surfaces were smooth and shiny but of a pale mucoid appearance, with a moderate amount of rather dull subepicardial fat present. The chambers were moderately dilated. Two small, pale gray-yellow thrombi were clinging to the right auricular wall. The endocardium was pale gray-red. The tricuspid valve measured 11 cm. in circumference. The leaflets and chordae tendineae were thin and delicate. The pulmonic valve measured 6 cm. in circumference, and its cusps were smooth and delicate. The mitral valve measured 8 cm. in circumference. The leaflets were relatively thin, but there were several small pale yellow-red granulations on the auricular surface just within the margins of the leaflets. In addition, there was an ulceration of the margin of the anterior cusp, to which a large friable thrombus (2 by 2 cm.) was attached. The chordae tendineae, papillary muscles and trabeculae carneae were not remarkable. The aortic valve measured 7 cm. in circumference. Its cusps were relatively smooth, even and regular, but there were several small, fine red-yellow granulations on the aortic surface just within the margins. The coronary vessels showed nothing remarkable. The left ventricular wall measured 1.3 cm. and the right ventricular wall 0.3 cm. in thickness. The myocardium was uniformly soft and flabby and was pale red.

Histologically, the myocardium showed infiltration of scattered polymorphonuclears and a few round cells. Several areas of necrosis were present, showing loss of architecture and considerable granular débris surrounded by fibroblasts. An infected thrombus with surrounding cellular infiltration was present in one section. The mitral vegetation showed a solid homogeneous platelet mass with marginal red blood cells and leukocytes. Several clumps of gram-negative, pleomorphic bacilli were present fairly deep in the vegetation. One of these is shown in the figure.

Kidneys: The left kidney weighed 225 Gm., and the right, 250 Gm. They were similar in appearance. Both were swollen and congested, with a dark blue-red color and numerous petechiae. Dull yellow-gray areas were scattered over the surfaces. The capsule stripped easily. The parenchyma seemed soft and flabby and on section had a congested, blue-red appearance, with numerous small irregular gray areas scattered through the cortex. The cortex measured 1 cm. in thickness, and its striations were somewhat obscured. The pyramids were rela-



Gram-negative pleomorphic bacilli in a vegetation of the anterior cusp of the mitral valve (Gram's stain: × 1,500).

tively distinct, with fanlike medullary rays. The mucosa of the pelvis was smooth but showed several petechiae. The ureters showed nothing remarkable.

Histologically, there was a fairly diffuse inflammatory reaction in the parenchyma, with conspicuous alterations in the glomeruli. Some of the glomeruli showed only slight damage, with polymorphonuclear infiltration and red blood cells, while others showed varying degrees of capsular thickening and endothelial proliferation. Occasional glomeruli appeared as a mass of cells with capillaries

completely closed, and some of the tubules about these were atrophied. Mononuclear and polymorphonuclear infiltration was present in the interstitial tissue. A small area of infarction, with complete necrosis of the parenchyma, was noted in one section. This was surrounded by a zone of leukocytic infiltration and distended capillaries. The collecting tubules showed numerous casts.

BACTERIOLOGIC STUDIES

The organisms from the blood and those from the culture of material from the throat in each instance were short, fat, gram-negative rods which on primary culture occurred singly and in double arrangement. Each produced smooth, pale gray, dome-shaped colonies with beta hemolysis after twenty-four hours' growth on rabbit blood agar plates, and each required the addition of the V factor (yeast extract) for growth in ordinary peptone water. However, the types of growth in broth cultures were not similar. The organism from the blood stream produced a uniform, fine turbidity, while that from the throat formed a coarse, granular mass at the bottom of the tube. Unfortunately, the pharyngeal strain was lost on subculturing before further studies could be made, and the following observations pertain only to the organism isolated from the blood culture.

Growth.—Although from five to eight days was required for the growth to appear in the original blood cultures, on subculture in liquid or solid mediums containing rabbit blood, horse blood or the V factor, growth was fairly pronounced in twenty-four hours. In forty-eight hours many of the surface colonies on solid mediums showed a characteristic central peak and peripheral ridge separated by a depressed zone. Repeated subculturing failed to alter the shiny, smooth, mucoid type of colony produced on the surface of solid mediums or the uniform, fine, cloudy growth in broth culture. Slight fluorescence was observed when colonies on Levinthal's medium were viewed with transmitted light against a dark background, but this was much more striking when ascitic fluid (20 per cent) agar slants moistened with a drop of rabbit blood were used as a culture medium. At room temperature incubation for from six to eight days was required to produce noticeable growth, while at body temperature abundant growth occurred in from twenty-four to forty-eight hours. The organism was a facultative anaerobe and grew equally well in mixtures of 10 per cent carbon dioxide. The following tabulation shows the effect of the X (heat-stable extract of blood) and the V factor on growth in peptone water. A uniform platinum loop was used for all transfers, and the presence of growth was checked in each tube by smears and subculture to a blood agar plate when necessary.

	Subcultures									
Medium	1	2	3	4	5	6	7	8	9	10
Peptone water	+	0	0	0	0	0	0	0	0	0
Peptone water plus X factor	+	+	0	0	0	0	0	0	0	0
Peptone water plus V factor	+	+	+	+	+	+	+	+	+	+

Each series was started with a loop full of twenty-four hour blood broth culture. Plus marks indicate growth, and zeros indicate no growth.

Microscopic Appearance.—The predominating form of the organism was a nonmotile, short, fat bacillus with square ends. It often occurred in pairs. Old cultures, however, showed many pleomorphic (coccobacillary to threadlike) forms. Bipolar staining was readily demonstrated with methylene blue. The organism was not acid-fast and showed no spores. Capsules were not demonstrated in material taken from an infected mouse's peritoneum by the Hiss capsule stain or by the india ink technic.

Hemolysis.—Beta hemolysis was produced by growth of the organism in poured plates containing either rabbit's or horse's blood. Furthermore, a twenty-four hour broth culture completely hemolyzed a 5 per cent suspension of washed red corpuscles of sheep in two hours at 37 C. when the two were mixed in equal parts. In the original blood cultures the organism hemolyzed the patient's blood in the broth culture but produced only an alpha type of hemolysis in the poured plates.

Viability.—The organism failed to survive a temperature of 41.5 C. for eleven hours or a temperature of 65 C. for one hour. A good growth on blood agar survived about ten days at room temperature.

Metabolic Activity.—The organism failed to produce indole or to reduce nitrates after abundant growth in a suitable medium for five days. With the standard beef extract, peptone water base, plus the V factor, the following carbohydrates were fermented slightly without the production of gas: dextrose, maltose, sucrose and xylose. With a surface inoculation on ascitic agar slants moistened with a drop of rabbit's blood, dextrose and maltose, but not sucrose, were fermented. All cultures for testing fermentation were incubated from ten to twelve days at 37 C. Fibrinolysin for human plasma clot could not be demonstrated in twenty-four hour Douglas broth cultures containing either 0.05 per cent or 2 per cent dextrose. This is in agreement with the data of Tillett and Garner [2] on two strains of hemolytic influenza bacilli.

Serologic Reactions.—A therapeutic Haemophilus influenzae antiserum obtained from Dr. Fothergill agglutinated a twenty-four hour broth culture of the organism in a titer of 1:64 at 56 C. Similar agglutination was produced with Br. abortus serum in a titer of 1:128. No agglutination was obtained with either a phase I antipertussis or an antitularemia serum.

Pathogenicity.—A peritoneal injection of from 0.5 to 1 cc. of a twenty-four hour blood broth culture usually killed mice in from six to eighteen hours. Cultures of blood taken from the tails of mice which had received an injection were positive after one hour. Comparable doses of the same cultures killed by being subjected to a temperature of 60 C. for one hour failed to kill mice. In guinea-pigs, an intraperitoneal injection of 1 cc. of a twenty-four hour blood broth culture failed to produce any obvious effect, and autopsy three weeks later showed a negative blood culture and no gross pathologic changes. Intradermal injections of from 0.1 to 0.25 cc. failed to show any appreciable effect. In experiments with rabbits, one rabbit received injections of an eighteen hour blood broth culture—5 cc. intravenously, 2 cc. intraperitoneally and 0.25 cc. intradermally—without effect. Autopsy three weeks later showed nothing remarkable. A hemorrhagic reaction resembling the Schwartzman type was produced in the skin of a rabbit by means of a Berkefeld filtrate of a seventy-two hour blood broth culture. The preparatory intradermal dose of 0.25 cc. was followed in eighteen hours by 4 cc. (0.33 cc. per kilogram) injected intravenously. The reaction could not be demonstrated if forty-eight hours was allowed to elapse between the two injections.

COMMENT

Since they were first described by Pritchett and Stillman,[1] in 1919, hemolytic organisms resembling H. influenzae have frequently been

2. Tillett, W. S., and Garner, R. L.: The Fibrinolytic Activity of Hemolytic Streptococci, J. Exper. Med. **58**:485, 1933.

isolated from the throats of healthy persons, but so far as is known they have not been observed in association with any pathologic process except in the few cases of subacute bacterial endocarditis recorded. The classification of these organisms and their exact relationship to H. influenzae are still matters of speculation. The present knowledge of them is concisely summarized in the following statement from Topley and Wilson's [3] textbook (second edition):

> They differ from the typical form of Hemophilus influenza (a) in producing hemolysis in sold or fluid media containing blood corpuscles, (b) in requiring the V factor but not the X factor for their growth, and (c) in fermenting maltose, saccharose and often dextrin. . . . It seems possible that they deserve a separate specific name or at least recognition as a named variety.

Because they are not strictly hemophils (requiring the V but not the X factor), Valentine and Rivers [4] suggested including them in the group of para-influenza bacilli. Cases of subacute bacterial endocarditis due to a nonhemolytic para-influenza bacillus have been reported by Russell and Fildes [5] and Stuart-Harris and his co-workers,[6] but in most of the reported cases of this type of disease caused by influenza bacilli the details of the requirement for growth have not been adequately studied —or at least the studies have not been adequately reported. On the other hand, the presence or absence of hemolysis could scarcely be overlooked. At present it is most difficult to decide whether the specific requirement for growth or the production of hemolysin is the more fundamental differential characteristic.

Clinically, the eight cases from which data are included in table 1 showed a typical picture of subacute bacterial endocarditis with a striking uniformity in duration (from five to ten weeks) and an invariably fatal termination. It is interesting that the organism isolated from the two patients who were ill for a longer period (five and seven months, respectively) produced only slight hemolysis. The initial symptoms were not sufficiently uniform to permit any conclusions about the mode of onset or the portal of entry of the organism. Apparently the disease was not immediately secondary to any other type of infection, but a past history of heart disease was mentioned in one half of the cases. In the present case, the presence of a mucopurulent postnasal discharge

---

3. Topley, W. W. C., and Wilson, G. S.: Principles of Bacteriology and Immunity, ed. 2, Baltimore, William Wood & Company, 1936.

4. Valentine, F. C. O., and Rivers, T. M.: Further Observations Concerning Growth Requirements of Hemophilic Bacilli, J. Exper. Med. **45**:993, 1927.

5. Russell, D. S., and Fildes, P.: A Case of Endocarditis in Man Associated with Bacillus Para-Influenza, Rivers, 1922, J. Path. & Bact. **31**:651, 1928.

6. Stuart-Harris, C. H.; Wells, A. Q.; Rosher, A. B.; Mackie, F. P., and Wilson, G. S.: Four Cases of Infective Endocarditis Due to Organisms Similar to Hemophilus Para-Influenza and One Case Due to a Pleomorphic Streptobacillus, J. Path. & Bact. **41**:407, 1935.

and the isolation of a hemolytic influenza bacillus from the throat suggested that the throat may have been the portal of entry, but the history did not support this theory and the organism from the throat was probably not identical with that found in the blood cultures.

It is interesting that although subacute bacterial endocarditis is rare in children, four of the eight patients were under 15 years of age. Also, it is perhaps significant that in the four cases the reports of which contained definite dates the illness occurred in the late summer or in the autumn.

The thermal death time [7] (eleven hours at 41.5 C.) of the organism in this case was similar to that of many strains of the gonococcus, and if this should prove to be a characteristic of other strains of hemolytic influenza bacilli, the use of fever therapy might be justified provided a definite diagnosis could be made before the disease progressed too far. Even though the risk of such a procedure is great, at present there is little else to offer therapeutically, and in the case reported only the rapid onset of uremia prevented its trial.

SUMMARY

A case of subacute bacterial endocarditis due to a hemolytic parainfluenza bacillus is reported and briefly compared with seven similar cases reported previously. Artificially induced fever as a possible form of treatment is suggested for this uniformly fatal disease.

7. Mr. H. F. Wengatz determined the thermal death time.

CONGENITAL STENOSIS OF THE ENTIRE COLON

AMOS C. GIPSON, M.D.

E. HOWELL CROSS, M.D.

AND

J. O. MORGAN, M.D.

GADSDEN, ALA.

Congenital atresia and stenosis of the intestine, exclusive of the pylorus, the rectum and the anal canal, are relatively rare and, according to Webb and Wangensteen,[1] occur in about one of twenty thousand infants.

Congenital atresia and stenosis are encountered less often in the colon than in the small intestine. Stenosis is the more uncommon of the two.

Atresia is defined as a congenital absence or pathologic closure of a normal opening or passage, whereas stenosis is the term applied to the narrowing of any canal.

Many cases of congenital atresia and stenosis in various parts of the colon have been reported. A search of the literature revealed only two authentic reports of cases of congenital stenosis of the entire colon (Kuliga[2] and Cole[3]). Two cases are reported here.

REPORT OF CASES

CASE 1.—*History.*—B., a white girl born on March 10, 1937, was admitted to the Holy Name of Jesus Hospital on March 13, 1937, with a history of persistent vomiting, which started about twelve hours after a normal birth. The vomitus was dark brown and streaked with blood and had a fecal odor. There had been no bowel movements since birth. Several enemas had been given, but these returned clear, with small shreds of mucus. The abdomen was distended at birth.

Examination.—The baby was acutely ill and dehydrated. The abdomen was markedly distended, and peristaltic waves of distended loops of intestine were visible over the entire abdomen. The little finger inserted into the rectum met no obstruction, but the rectum was so tight that the finger was slightly numb on

1. Webb, C. H., and Wangensteen, O. H.: Congenital Intestinal Atresia, Am. J. Dis. Child. **41**:262 (Feb.) 1931.

2. Kuliga, P.: Zur Genese der congenitalen Dünndarmstenosen und Atresien, Beitr. z. path. Anat. u. z. allg. Path. **33**:481, 1903.

3. Cole, Warren H.: Congenital Malformations of the Intestinal Tract and Bile Ducts in Infancy and in Childhood, Arch. Surg. **23**:820 (Nov.) 1931.

withdrawal. The preoperative diagnosis was an intestinal obstruction, probably congenital atresia in the region of the cecum.

Operation.—With the aid of procaine hydrochloride anesthesia a right rectus incision 5 inches (12.5 cm.) in length was made by one of us (E. H. C.). When the peritoneum was opened distended loops of small intestine were encountered. The entire large bowel and a few centimeters of small bowel were stenosed to such a point that anastomosis was impossible. An ileostomy was done, and the small bowel was emptied of fecal material. The abdomen was closed in layers.

Fig. 1 (case 1).—Haustral markings appear on the hepatic and splenic flexures of the colon but are absent on the descending portion.

Autopsy.—Postmortem examination revealed a distended small intestine, gradually becoming smaller as it approached the cecum. The entire colon was smaller in circumference than an ordinary pencil; the appendix, about the size of the lead.

Haustral markings were visible on the hepatic and splenic flexures of the colon but absent on the descending colon (fig. 1). The lumen of the colon was patent throughout. The stenosis extended to the anus.

The length of the colon was 33 cm.; its width, 8 cm. The cecum was 3 cm. long and from 1 to 2 cm. wide. The appendix measured 3 by 0.2 cm.

CASE 2.—*History.*—C., a white girl born April 22, 1937, was admitted to the Holy Name of Jesus Hospital on April 23, with a history of persistent projectile vomiting, which started about twelve hours after a breach delivery, labor having lasted twenty-seven hours. The vomitus was definitely fecal. The baby had no bowel movements after birth. Two enemas were given, but only small amounts of mucus were returned, and only a small amount of water could be introduced.

Fig. 2 (case 2).—The small intestine becomes smaller near the junction of the jejunum and the ileum. The size of the colon is about half that of a pencil.

Examination.—The baby appeared well developed and well nourished. The abdomen was slightly distended, and there was frequent vomiting. Since this patient was admitted so soon after the first, the preoperative diagnosis was intestinal obstruction, probably from congenital stenosis of the colon.

Operation.—With the aid of ether anesthesia a paramedian incision was made by one of us (J. O. M.). When the peritoneum was opened, distended loops of small intestine were encountered, in which there was a straw-colored fluid. An enterostomy was done at the lowest normal point in the small intestine, and a catheter was brought out through the incision in the lower right quadrant of the abdomen. The abdomen was closed without a drain. Since sufficient drainage was not obtained through the catheter and vomiting continued, a second operation was performed three days later and a colostomy done. The baby continued to vomit until death, May 7, 1937, fifteen days after birth.

Autopsy.—The abdomen was opened through the operative wound, and the small intestine was traced. It rapidly became much smaller at about the junction of the jejunum and the ileum and continued to the cecum. The entire colon was stenosed, being about half the size of a pencil (fig. 2). The lumen was patent throughout.

The length of the ileum was 33 cm.; its width from 0.5 to 1 cm. The cecum was 1 cm. long and from 0.5 to 1 cm. wide. The appendix measured 3.5 by 0.2 cm., and the colon was 36 cm. long. The hepatic flexure was 0.8 cm. wide; the transverse colon, 0.2 cm., and the rectosigmoid, from 0.9 to 1.1 cm.

SUMMARY

Two cases of congenital stenosis of the entire colon are reported.

A review of the literature shows that only two similar cases have been previously reported.

CONGENITAL THROMBOPENIA

LEONARD T. DAVIDSON, M.D.
NEW YORK

A review of the literature on purpura as a complication of pregnancy and as a congenital condition in the fetus was given by Sanford and his associates[1] in 1936 in a report of a case in an infant observed by them. The literature deals mainly with the manifestations in the mother; little consideration is given to the condition in the newly born infant. The present report is of interest because the mother first came under observation at the age of 11 years and was observed through her first pregnancy. She was delivered of an infant who at birth showed the classic picture of thrombocytopenic purpura; the child was observed to the age of 2¼ years.

REPORT OF A CASE

The patient was a girl born at full term by spontaneous delivery. The weight at birth was 3,470 Gm. (7 pounds and 9 ounces). The measurements at birth were as follows: head 34.5 cm., chest 31 cm. and length 53 cm. The breathing was normal; the cry was feeble, but the color was good. There was generalized purpura of the skin of the entire body, with several large ecchymoses at points of pressure. The only other site of bleeding was in the soft palate just anterior to the uvula.

The infant was transferred to the Babies Hospital two hours after delivery. The skin was pink, with good turgor. There was a widespread petechial rash involving the entire body, including the scalp. The petechiae varied in diameter from 2 to 5 mm. Several ecchymoses were noted in the extremities. The tourniquet test (Rumpel-Leede) gave a positive reaction in one minute. There were numerous hemorrhages in the posterior pharynx, which gave the appearance of small red jelly-like blebs. The nasal, vaginal and rectal mucous membranes were clear. There was no bleeding into the umbilical stump. The spleen was not palpable, and the liver was barely so. The abdomen was soft. The results of the first examination of the blood and of subsequent ones are tabulated in the table. The urine showed a trace of albumin, 1 or 2 leukocytes per high power field and an occasional red blood cell. The benzidine test gave negative results.

From the Department of Diseases of Children, Columbia University College of Physicians and Surgeons, the Babies Hospital and the Sloane Hospital for Women.

1. Sanford, H. N.; Leslie, E. I., and Crane, M. M.: Congenital Thrombocytopenia, Am. J. Dis. Child. **51**:1114 (May) 1936.

Results of Examination of the Blood

Age	Hemoglobin Gm.	Hemoglobin Sahli, %	Red Cells per Cu. Mm.	Platelets per Cu. Mm.	White Cells per Cu. Mm.	Polymorphonuclears, %	Lymphocytes, %	Monocytes, %	Eosinophils, %	Myeloblasts, %	Myelocytes, %	Normoblasts per 100 White Cells	Reticulocytes, %	Bleeding Time, Min.	Coagulation Time, Min.	Schilling Count	Clot Retraction Time
3 hr.	24.6	145	5.1	56,000	42,700	79	21	..	..	..	..	4	4.2	3.0	7.0	3-52-24	.....
								Transfusion, 60 Cc.									
1 day	25.6	151	5.5	52,000	21,800	75	24	..	1	..	..	..	...	3.5	4.5	3-34-38	None 24 hr.
2 days	23.6	133	4.7	50,000	14,500	65	27	..	7	..	1	1	...	...	...	2-42-21	.....
								Transfusion, 50 Cc.									
3 days	21.2	125	5.3	40,000	14,560	59	36	..	3	..	1	..	5.1	...	...	5-40-14	None 24 hr.
								Bothrops Antitoxin, 5 Cc. Intravenously									
4 days	17.0	100	4.6	34,000	19,600	53	41	..	5	1	..	1	...	...	...	7-50-21	None 24 hr.
5 days	16.1	95	4.7	38,000	13,600	53	46	..	1	..	..	..	2.8	...	2.5	7-33-13	.....
10 days	17.8	105	5.1	30,000	25,700	77	28	..	3	..	2	..	0.72	...	...	6-42-19	None 24 hr.
2 wk.	16.1	95	4.9	36,000	23,800	32	63	1	1	1	..	..	0.6	...	...	4-19- 9	.....
2½ wk.	16.1	95	4.0	28,000	11,200	37	61	1	..	1	..	..	...	3.5	2.5	3-26- 8	.....
3 wk.	14.9	88	3.9	32,000	8,300	45	45	1	5	..	..	.	0.72	...	...	6-31- 8	.....
4 wk.	13.2	78	4.2	34,000	13,300	51	43	..	5	..	1	..	...	...	...	10-23-18	.....
5 wk.	12.4	73	2.9	30,000	16,800	44	50	1	6	..	..	..	1.2	6.5	2.5	2-30-12	.....
2½ mo.	9.9	53	2.6	672,000	8,200	48	34	10	7	..	..	..	1.0	...	...	4-27-17	Normal
8 mo.	12.9	76	3.8	568,000	13,000	29	71	..	..	..	..	..	0.8	...	...	2-11-16	Normal
15 mo.	13.6	80	4.3	600,000	16,600	43	49	7	1	..	..	..	1.0	...	...	0- 6-37	.....
23 mo.	13.6	80	4.4	465,000	11,500	27	62	7	3	..	..	..	0.24	1.5	3.5	0- 4-23	Normal
27 mo.	13.6	80	4.7	510,000	13,300	64	28	6	2	..	..	..	0.3	...	...	0- 8-56	Normal

An immediate intravenous transfusion of 60 cc. of citrated blood from a professional donor was given without effect. The petechiae increased in size, and from time to time new crops appeared. On the third day vomiting of coffee-ground material with some bright red blood began, and a second transfusion, of 50 cc. of citrated blood from a professional donor, was given. Large extravasations of blood into the tissues occurred about the sites of transfusion. On the fourth day bright blood appeared in the stool, and there was free bleeding from the vagina as well as continued vomiting of dark and bright blood. An intravenous injection of 5 cc. of bothrops antitoxin [2] was given without effect on the platelet count but with definite clinical improvement. Bleeding was appreciably less the next day and ceased entirely on the day following. The petechiae gradually faded, and the recovery was uneventful, with no recurrence of purpuric manifestations.

When the infant was 2 weeks of age severe diarrhea developed, necessitating starvation for twenty-four hours and a gradual return to an adequate caloric intake.

The infant was discharged from the hospital at the age of 5 weeks in good condition, although she was still 10 Gm. under her weight at birth. A blood count showed 30,000 platelets per cubic millimeter, 12.4 Gm. of hemoglobin per hundred cubic centimeters (73 per cent) and 2,900,000 erythrocytes per cubic millimeter. At the first follow-up visit, six weeks after the infant's discharge from the hospital, the number of platelets had risen to 672,000, and they remained at a consistently high level. At the last count, when the child was 27 months of age, they numbered 510,000. After she left the hospital an occasional "black and blue" spot appeared on the extremities when she bumped into furniture, but there was no bleeding of any kind. She developed well and her color remained good. Her general condition was excellent.

COMMENT

This infant is of especial interest because of the presence of thrombocytopenic purpura in the mother, who had been under observation at the Presbyterian Hospital from the age of 11 years and had been included in the report of Brown and Elliott [3] on the results of splenectomy in cases of thrombocytopenic purpura. She had had a history of frequent epistaxis and easy bruising from the age of 3 years and was first seen during an acute phase of the disease, with bleeding from the nose, vagina, urinary tract and bowel and into the retina and the skin. At that time a blood count showed hemoglobin 21 per cent and red cells 1,900,000, white cells 24,000 and platelets 28,000 per cubic millimeter. The bleeding time was fifty-eight minutes and the coagulation time one and one-half minutes. A clot retraction test was not done. She improved greatly for two weeks, after which a profuse hemorrhage from the gastro-intestinal tract suddenly occurred. An emergency splenectomy was done on Feb. 26, 1926. She recovered, but the bleeding

2. Antivenin (bothropic) of Sharp & Dohme (described in "New and Non-official Remedies") was used.

3. Brown, D. N., and Elliott, R. H. Egerton: The Results of Splenectomy in Thrombocytopenic Purpura, J. A. M. A. **107**:1781-1788 (Nov. 28) 1936.

tendency persisted in a mild form for eight and one-half years after the splenectomy. The platelets ranged from 6,000 to 47,000 per cubic millimeter during that time.

In September 1934, at the age of 21, she was delivered spontaneously of the full term infant whose case is reported. Throughout the pregnancy there were frequent severe nosebleeds and occasional scattered crops of petechiae. There was a large postpartum hemorrhage (2,000 cc.). Two transfusions were given, after which she made an uneventful recovery, and there was no serious bleeding afterward. Six months post partum her platelets numbered 21,000 per cubic millimeter.

The infant was born with the classic picture of thrombocytopenic purpura. The bleeding time and the coagulation time were not markedly prolonged, but there were 56,000 platelets. The bleeding increased in extent and severity in spite of two transfusions, thus ruling out hemorrhagic disease of the new-born. Clinical improvement was first noted on the fourth day of life after the administration of 5 cc. of bothrops antitoxin. No effect was observed on the platelets, however, which continued to decrease slowly until they numbered 28,000 per cubic millimeter, when the infant was 2½ weeks old. They remained at this level for the next two and one-half weeks, although there was no further bleeding of any kind. It is unfortunate that frequent interim observation was impossible because the infant lived at a distance from the hospital, for it would be interesting to know at what age the platelets reached the normal level, where they were found to be when the infant was seen at the age of 2½ months.

In contrast, the mother's platelets fluctuated between 6,000 and 47,000 for many years prior to her parturition and did not go above 21,000 for two and one-quarter years afterward, although no major bleeding episode occurred. It seems probable that the mother belongs permanently in the class described by Sanford [1] of persons who, except in the major strains of life, are protected from excessive bleeding by the increased disintegrative ability of the platelets, the number of which consistently remains far below normal. Whether the infant falls into this class can be determined only by further observation.

SUMMARY

A case is reported of congenital thrombopenia in an infant born of a mother who had undergone splenectomy eight and one-half years previously for critical thrombocytopenic purpura and whose platelets were always at an extremely low level. The infant after severe neonatal hemorrhage showed complete clinical recovery at the age of 8 days, although the platelets are not known to have reached a normal level until she was 2½ months old.

Progress in Pediatrics

MACROGLOSSIA IN CHILDREN

REVIEW OF THE LITERATURE, REPORT OF A CASE OF TRUE MUSCULAR HYPERTROPHY AND A SUGGESTED CLASSIFICATION

I. P. BRONSTEIN, M.D.

S. M. ABELSON, M.D.

RICHARD H. JAFFÉ, M.D.

AND

G. VON BONIN, M.D.

CHICAGO

Uniform enlargement of the tongue in infancy and in childhood is generally associated with cretinism, mongolism or some other types of idiocy. In cases of thyroid deficiency the abnormal size of the tongue is due to infiltration with mucoid material. In thirty-eight mongolian idiots, three of whom were Negroes, we usually found the tongue furrowed, and we felt that its protrusion was not due to an actual increase in its size. In other types of idiots the apparently large tongue protrudes from the mouth because of faulty coordination. In cases of myotonia congenita, which is characterized by great hypertrophy of the voluntary musculature, biopsy of the muscles in infancy reveals that the structure is normal histologically.

The first knowledge of macroglossia has been attributed to Galenus. At his time and long afterward macroglossia signified any lesion of the tongue which caused it to swell. In the literature, under macroglossia are included in addition to the more frequent types of lymphangioma, which are associated with no muscular changes, the less frequent types of tumefactions, such as cyst, lipoma, carcinoma, hemangioma, amyloid infiltration and the infiltration which accompanies hemophilia, Recklinghausen's disease, keloid formation and hyperpituitarism.

Lymphangioma as a cause of enlargement of the tongue is so common that Bassetta and several other writers considered macroglossia synonymous with lymphangioma. This concept was first emphasized by Virchow, when he investigated two instances of enlarge-

From the Departments of Pediatrics, Pathology and Anatomy, University of Illinois College of Medicine, and the Research and Educational Hospital.

ment of the tongue after one of his associates described a case of muscular hypertrophy in an adult. He finally concluded that lymphangioma is the most common cause of macroglossia.

Macroglossia due to muscular hypertrophy in an otherwise normal child is rare. No case reports published since the excellent and exclusive reviews of Bassetta and Welzel over twenty-five years ago could be found. Janse and other authors who reported cases of macroglossia associated with micrognathia and respiratory difficulty stressed the receding, small mandible as the major feature. In Kitaigorodskaja's study of hypertrophy involving various parts of the body, a case was reported of uniform enlargement of the tongue in a normal child; microscopic studies were not made. Bassetta emphasized the importance of microscopic examination and confirmation before acceptance of the macroglossia as due to muscular hypertrophy.

In most of the cases reviewed by Bassetta and Welzel and in several recently reported (DeLange, Debré and Sémelaigne, Hall and others) the condition was associated with generalized or localized muscular hypertrophy of the rest of the body.

We wish to report a case in a child of uniform enlargement of the tongue due to muscular hypertrophy, with microscopic studies and comparative measurements of the muscle fibers.

REPORT OF CASE

P. A. S., a girl born on May 8, 1934, a first-born and only child, was first seen at the age of 16 months, in October 1935 (fig. 1). She was referred for studies of the thyroid because of a greatly enlarged tongue. Prior to our seeing her she had received 15 grains (1 Gm.) of thyroid extract over a period of thirty days without effect on the tongue or the general condition except for loss of weight and marked irritability.

The child was born at full term, weighing 8¼ pounds (3,742 Gm.). She was breast fed for seven months, had adequate amounts of cod liver oil and orange juice and at the time of the examination was on a regular, well balanced diet. The developmental processes, physical as well as mental, were normal. She had her first tooth at the age of 6 months, sat erect at 7 months, walked at 1 year and began using simple words at 14 or 15 months. She was well behaved and active and had control of both the bowels and the bladder. The family history and her own history revealed nothing relevant. The mother had had no miscarriages, and the pregnancy and labor were normal. The father was 46 years old and the mother 40, and both were in good health. The mother was over 38 years of age when the child was born; the work of Murphy is of interest in this connection because it involves the relation of the age of the mother to the conception of congenitally deformed children.

The tongue had been huge and protruding since birth. It interfered with nursing at the breast, and supplementary feedings were necessary. When the

child was eating the tongue could readily be drawn into the mouth. Breathing was normal except during infections of the respiratory tract, when she kept her mouth open. At no time had the parents noted periodic swelling, inflammation or soreness.

Examination revealed that the girl was well nourished and well developed, weighing 23 pounds and 1 ounce (10.4 Kg.). The reflexes were normal and there were no abnormalities of the muscular system or any evidence of hypertrophy, hypertonia or hemihypertrophy.[1]

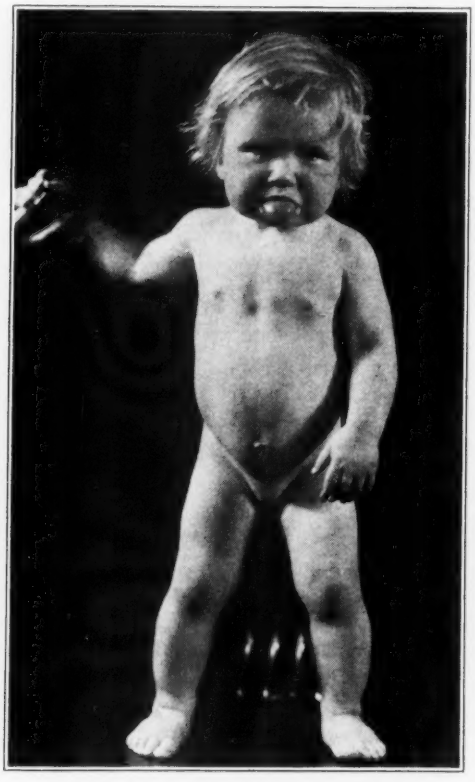


Fig. 1.—The patient at the age of 16 months.

Sixteen teeth were present, although the abnormal size of the tongue had pushed the lower dental arch forward. The lower teeth extended 0.5 cm. anteriorly from the upper teeth. The closing of the jaws and teeth caused some difficulty in breathing and swallowing by forcing the tongue back into the pharynx. There was no evidence of micrognathia.

---

1. The measurements were as follows: (1) midarm, left and right, 16 cm.; (2) midforearm, left and right, 14 cm.; (3) midthigh, left and right, 28 cm.; (4) midcalf, left and right, 19 cm.; (5) head, 48 cm.; (6) chest, 51 cm., and (7) abdomen, 47.5 cm.

The enlargement of the tongue was uniform and involved the entire organ. There was no evidence of nodular masses or abnormal consistency, nor was the appearance unusual. The organ moved freely, the form was readily altered and it could be protruded or withdrawn with ease. It was smooth and moist, with no enlarged papillae.

The laboratory studies tended further to exclude general lesions which might be related to and associated with the enlargement of the tongue. The blood sugar content during fasting was normal; the Kahn reaction was negative, and examination of the urine gave negative results. A blood count showed secondary anemia, with nothing unusual in the differential smear. The cholesterol content was within normal limits. The electrocardiogram was normal. The blood pressure was 112 systolic and 90 diastolic; the child was crying and irritable while it was measured.

Fluoroscopy of the heart and the lungs gave negative results. A roentgenogram of the abdomen revealed nothing abnormal, and a roentgenogram of the wrist showed that ossification was normal for the age.

It was impossible to obtain gastro-intestinal and genito-urinary visualization because of the lack of cooperation.

The child was admitted to the hospital on Feb. 25, 1936, for biopsy of the tongue. A small section of tissue was taken from the lateral aspect about one third of the way up on the right side. There was little postoperative bleeding, and the wound healed well. At a subsequent date a biopsy was performed on tissue from a corresponding area on the tongue of a normal child of approximately the same age. Similar stains and methods of preparation were used (figs. 2 and 3).

Subsequent Course.—The patient was seen on Nov. 10, 1936 (age, 29 months), at which time there were no complaints. She weighed 30 pounds and 14 ounces (14 Kg.) and was 35¼ inches (89 cm.) tall. Her activity was that of a normal girl. There were no difficulties with the urinary tract or the bowels. The parents thought that the tongue was definitely smaller.

Biopsy of the Tongue.—The biopsy of the tongue showed moderate thickening of the surface epithelium. Underneath the epithelium there was a thin layer of edematous connective tissue which was loosely infiltrated by small round cells and contained dilated lymph vessels.[2]

The most striking feature was the increase in the size of the muscle fibers. Except for this increase the muscle fibers did not reveal any anomalies. They showed well marked cross-striation and longitudinal fibrillation; the nuclei were spaced at regular intervals and contained a dense net of fine chromatin granules. With Van Gieson's stain the muscle fibers became brass-yellow, and with Mallory's aniline blue stain they assumed a purple-red color. They were arranged in bundles which were enclosed in scanty connective tissue. Nerve fibers and blood vessels were present in the proper number. Best's carmine stain failed to show any glycogen in the material which had been fixed in a solution of formaldehyde. This

2. Monnier and Lorrain, who studied a section of tongue removed from a girl 8 years old with congenital macroglossia, indicated that the exposed part of the tongue was subject to trauma and inflammation. They observed that the mucous membrane was thickened and chronically inflamed, with dilatation of the lymphatic spaces.

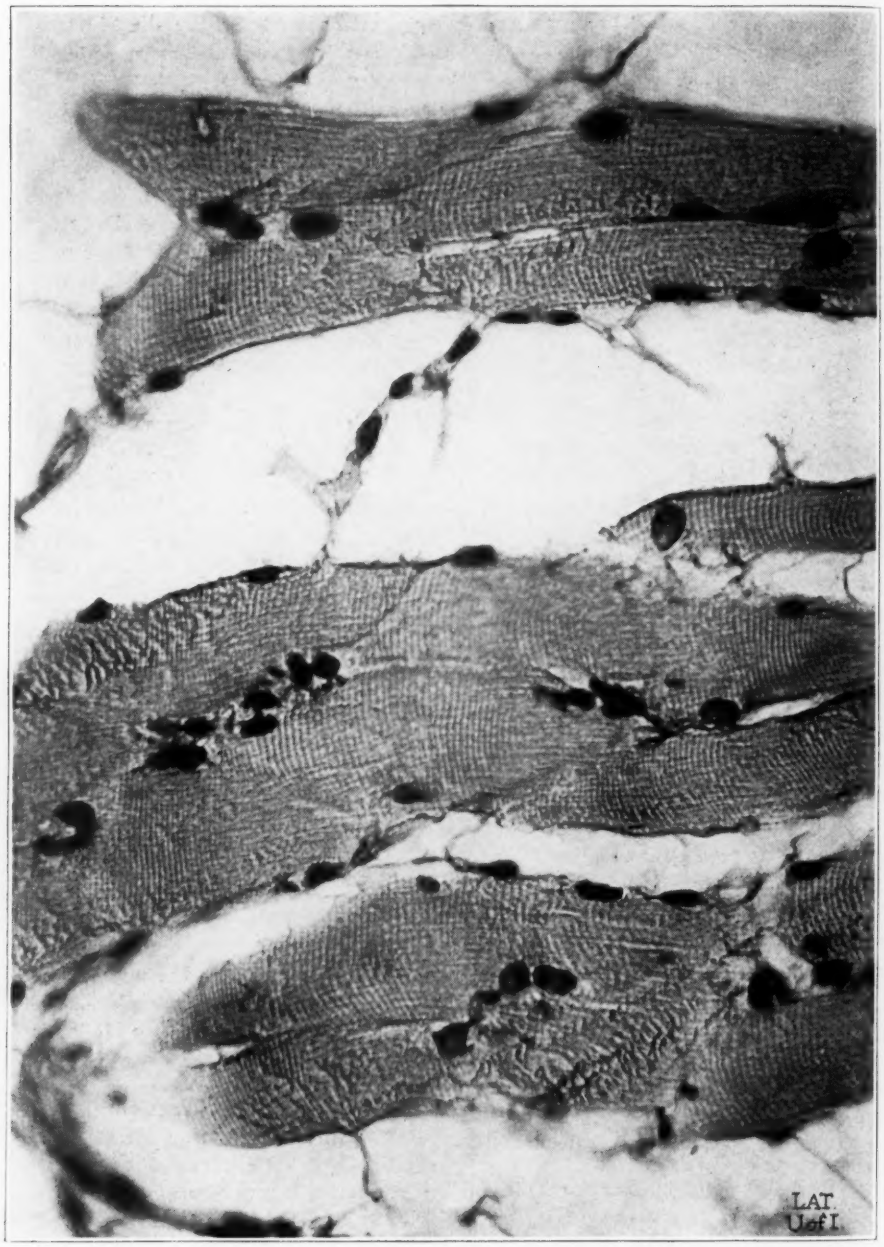


Fig. 2.—Photomicrograph (× 680) of a section of the patient's tongue.

Fig. 3.—Photomicrograph (× 680) of a section of the tongue of a normal child of approximately the same age as the patient.

excluded Von Gierke's disease, although enlargement of the tongue is not mentioned as an associated finding in the reports of studies of glycogen storage disease.

Biometric Study.—So that we might decide whether the individual muscle fibers are increased in size in macroglossia, a number of fibers from a normal tongue and from the diseased tongue were measured as to their breadth in arbitrary units (expressed in intervals of the ocular micrometer). The measurements are shown in table 1. The question put to the statistician was this: Is one justified in assuming that there is a real difference in the breadth of the fibers in the two tongues? It is clear from a glance at table 1 that the two distribution curves actually overlap to a large extent. Thus, if one were shown just one fiber with a diameter of between 4 and 7 units, one would be unable to say from which sample it had come. It is equally clear, on the other hand, that the mean diameter of the fibers from our pathologic specimen differed from that of the fibers from the normal one. Is this difference of the means due merely to chance? The scientific

TABLE 1.—*Frequency Distributions*

Intervals	Macroglossia	Normal
3	..	8
4	3	30
5	14	58
6	52	2
7	12	2
8	14	
9	5	

TABLE 2.—*Statistical Constants of Distribution Curves*

	Mean	Standard Deviation	Coefficient of Variation	$\beta 1$	$\beta 2$	χ
Normal	15.3 ± 0.23	2.30 ± 0.16	15.0 ± 1.53	0.0053	4.62	0.020 ± 0.12
Macroglossia	21.2 ± 0.33	3.26 ± 0.23	17.1 ± 1.86	0.421	2.96	0.59 ± 0.12

value one is prepared to attach to the answer will depend on one's belief in the "reality" of an average at which nature may aim but which she frequently fails precisely to attain.

We computed in the usual way the statistical constants which could be derived from the first four moments.[3] The results are set forth in table 2. Throughout, we have given standard, not probable, errors. The odds against the possibility that a difference between two constants is due to chance are 1 to 100 if that difference is 2.58 times its standard error.

We found in the first place that the two distribution curves differ in shape, as expressed in table 2 by the constant χ. This constant is only insignificantly different from zero for the normal sample, but its deviation from zero is almost 5 times its error for the sample from the hypertrophied tongue, having for that sample a positive sign, which shows that the curve trails off toward the higher values. While the morphologically normal sample can thus be described by the "normal" curve (normal now being used in the mathematical sense), the curve for the pathologic sample shows a distinctly "skew" distribution (fig. 4).

3. The details of computation as well as the notation employed here are to be found in Pearl, Raymond: Introduction to Medical Biometry and Statistics, ed. 2, Philadelphia, W. B. Saunders Company, 1930.

We found in the second place that for the hypertrophied tongue the mean diameter exceeded that for the normal tongue by 5.9 ± 0.4 microns. This difference is 14.75 times its standard error, a value which could be expected on the basis of chance only once in many million trials.

Turning finally to the standard deviation, we found by the same method a significant difference; but the coefficient of variation changed but insignificantly.

Altogether, one can say that in this case of hypertrophy the mean diameter of the individual muscle fibers was beyond doubt increased but that the increase in growth did not appear to affect all the fibers to the same degree. Whatever its cause, the process did not hit every fiber with the same force. Some were hardly affected, and others were only moderately enlarged, while a few experienced the full vigor of the stimulus. From a biometric point of view, the additional information given by a study of the higher moments is of definite value.

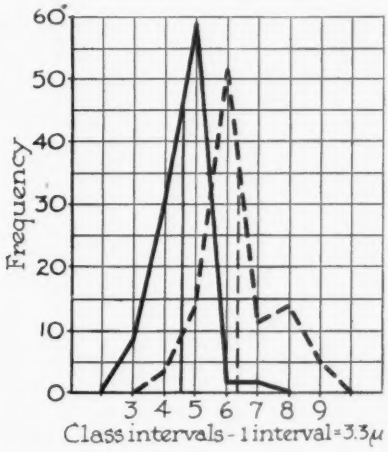


Fig. 4.—Distribution curves of the diameters of muscle fibers. The perpendicular lines denote the means. The unbroken line is the curve for the normal tongue, and the broken line, the curve for the tongue of the patient.

COMMENT

In our original study we disregarded cases of nodular or unilateral enlargement as well as those of macroglossia associated with generalized or localized muscular hypertrophy, since they seemed unrelated to ours. However, after studying the reviews of Bassetta and Welzel, in which were included all cases of enlargement of the tongue in which biopsy of the enlarged or abnormal area showed muscular tissue, we realized that (1) various types of muscular macroglossia were being discussed, (2) there was apparent disagreement as to the acceptability of the individual cases and (3) a working classification was lacking. We therefore decided to restudy and possibly clarify the cases the reports of which were accessible to us and which lent themselves to critical analysis.

We are of the opinion that muscular macroglossia can be divided into four clinical types:

1. Nodular enlargement not confined to exactly one half of the tongue.

2. Unilateral enlargement associated with localized hypertrophy of the same side of the face or jaw or hemihypertrophy of the body.

3. Uniform enlargement associated with generalized muscular hypertrophy of the rest of the body.

4. Uniform enlargement with no other ascertainable abnormalities.

These types, although histologically similar in that they all show muscular involvement, are nevertheless clinically and etiologically different. We could see no relation between enlargement of the tongue due to rhabdomyoma and enlargement associated, for example, with generalized muscular hypertrophy of the rest of the body. Yet cases of all these types have been included indiscriminately by reviewing authors. We believe that for the present our classification of muscular macroglossia into the aforementioned groups will make for greater understanding in prognosis and treatment.

Type 1.—Although earlier writers (Weber, Busch, Welzel, Bassetta) included many cases of type 1 macroglossia as instances of muscular macroglossia, more recently this type has been reported as rhabdomyoma. In fact, Weber's case, in which the condition has since been conceded (Borst, Fujinami, Abrikossoff) to have been due to rhabdomyoma (myoblastoma), prompted Virchow's original investigation in this field. Weber's case, significantly, is the only one of the cases of muscular macroglossia reviewed by Bassetta and Welzel which occurred in an adult. Recent reports have included only one case of rhabdomyoma in a child (Rutz), while the reports of Keynes, Abrikossoff and Dewey included five cases in adults. Clinically, rhabdomyoma of the tongue is slow growing, causes nodular enlargement of the tongue, is not encapsulated, has a marked tendency to recur after removal and, as noted, is much more common in adults. All authors stress the presence of embryonal muscle cells in sections of rhabdomyoma. Bassetta, in the report of his second case, which occurred in a girl of 5 months, gave a detailed description of the muscle tissue and commented on the embryonal characteristics of some of the cells without associating them with the characteristics of the cells in benign tumors of the muscle. As a matter of fact, the growth recurred after surgical removal, which emphasized the myoblastomatous nature of the tumor.

In the sections made in our case (fig. 2) no embryonal cells were observed. This was also true of the cases of muscular macroglossia which could be classified as rhabdomyoma reported by other authors.

Type 2.—The enlargement was of type 2 in the largest number of cases reported. However, in most of these the condition was recorded as hemihypertrophy of the body, since that was the striking feature and the one-sided enlargement of the tongue was only a small part of the clinical picture. Rarely, however, the enlargement of the tongue was the outstanding feature (Arnheim, Maas), and infrequently the entire tongue was enlarged although the hypertrophy of the other parts of the body was unilateral (Welzel, Kopal).

Earlier writers usually cited Trelat and Morrad's explanation of vasoconstrictor paralysis with stasis of the blood and consequent hypertrophy as a simple and adequate explanation. In 1917 Cohen listed five other theories gleaned from the literature to explain hemihypertrophy. These included (1) arrested development of the media of associated arteries, (2) intra-uterine meningitis of the brain and spinal cord, (3) faulty development of the spinal cord, (4) enlargement of one side of the cerebrum and (5) alteration of internal secretions, possibly hyperpituitarism. These theories were all based on fragmentary evidence and have only historical interest. Recent writers usually credit as the most plausible explanation Gesell's contention that hemihypertrophy is a variation of the twinning process.

Since the enlargement of the tongue is one sided and usually not excessive and is associated with more disabling deformities, intervention to correct it is rarely indicated.

Type 3.—Macroglossia of type 3 is uncommon, although DeLange, Debré and Sémelaigne and Hall and his co-workers recently called attention to it; only five or six cases have been reported. Of the earlier cases, those of Fehleisen, Felsenthal, Baginsky and Bruck, that of Bruck has provoked the most discussion, because of its unusual nature and Bruck's detailed clinical description, which suggested intracranial involvement.

Debré and Sémelaigne recently reported two cases of diffuse muscular hypertrophy; this condition was accompanied in the second case by muscular hypertonia. The tongue was enlarged in both cases. The second child was transformed by thyroid therapy. They maintained that congenital hypothyroidism was the cause of the clinical syndrome observed in their patients and intimated also that the macroglossia as well as the enlargement of the orbicularis, sternomastoid and masseter muscles was due to muscular hypertrophy. They contended that DeLange's three cases of generalized muscular hypertrophy, in one of which (case 3) the condition was associated with macroglossia, were also cases of thyroid insufficiency. They said that in their second case the muscular hypertrophy might have been the result of an overcharge of the muscles of a metabolic order and of neuro-endocrine origin.

DeLange was able to demonstrate lesions of the corpus striatum in her first case to account for the syndrome. Hall and his co-workers could find no evidence of endocrine disturbance and associated the muscular hypertrophy with extrapyramidal motor disturbances, as did DeLange. They observed in a biopsy of the deltoid and gastrocnemius muscles that the individual fibers were normal in length and diameter and that the nuclei were normal in size, shape and number. These observations contrast interestingly with those in a histopathologic study by Marinesco of the muscles in a case of congenital myxedema in which there was evidence of arrested and retarded development. Alterations appeared in the fine structure of the muscular fibers, with inequality in size. Primary myopathic changes were not observed in all the muscles, nor did they involve an entire muscle.[4]

Furthermore, Debré and Sémelaigne's first patient was seen at the age of 10 months and the facies was suggestive of thyroid deficiency. Their second patient was seen at the age of 2 years and showed spectacular response to thyroid therapy. In our studies with thirty-six thyroid-deficient children, in seven of whom the condition was recognized at the age of 6 months or earlier, no muscular hypertrophy or hypertonia was observed with the cretinous macroglossia.

Felsenthal, whose report was not cited by DeLange, Debré and Sémelaigne or Hall and his co-workers, although the condition seems related to the one they were describing, offered premature synostosis of the os tribasilare as an explanation of the syndrome observed in his patient and intimated a possible relation to cretinism. In addition, from the measurements recorded of the individual extremities, there is some evidence that the hypertrophy was asymmetrical and not uniform.

The enlargement of the tongue associated with thyroid insufficiency yields readily to specific treatment. However, the enlargement associated with the type of hypertrophy represented by the reports of Bruck, DeLange and Hall and his co-workers offers little in the way of active therapy other than symptomatic treatment of the tongue by surgical means, such as ligation of both lingual arteries or excision of a wedge-shaped section (Fehleisen, Bruck).

Type 4.—Macroglossia of type 4 includes enlargement of the tongue which is associated with no other discernible abnormality, as in our case.

---

4. In a biopsy of the pectoral muscle of an untreated 13 year old female cretin, in which both longitudinal and cross-cut sections were made, we observed that in the longitudinal section the muscle fibers were wavy, thin, and stretched and appeared semihyalinized and that the nuclei were often arranged in long rows. Throughout there was a marked fatty infiltration of the stroma, and adjacent areas appeared atrophied. In the cross-section there appeared to be fragmentation of the bundles; the nuclei were scanty and shrunken. A cross-section of a small nerve in this section showed swelling of the fibers by fatty infiltration.

This is probably the most interesting type, because of its obscure origin, and perhaps the term idiopathic muscular macroglossia should be restricted to it. An analysis of the cases of this type suggests that idiopathic muscular macroglossia may be associated with malformations of other organs, particularly those of the gastro-intestinal tract.

Baginsky's third patient with macroglossia, who was otherwise normal, died at the age of 4 months. At postmortem examination an enlargement of the fundus of the stomach was observed. Baginsky expressed the thought that this was no mere accidental condition but that with macroglossia faulty development of the gastro-intestinal tract may occur, since the tongue is embryologically derived from the same source.

Helbing studied an otherwise normal child, aged 5 months, with macroglossia. This patient died of measles at the age of 1 year. An anomaly in the position of the cecum was found; it was situated underneath the liver, which is its usual position in the third month of fetal life. Helbing, like Baginsky, pointed out that the arrest in the development of the cecum had some relation to the macroglossia, since both the cecum and the tongue are members of the gastro-intestinal tract. Hall and his co-workers in their patient with the syndrome of congenital muscular hypertrophy, extrapyramidal motor disturbance and mental deficiency found by roentgen examination of the gastro-intestinal tract an abnormality in the form of an annular constriction at the level of the ileocecal valve and suggested the possibility of its being a congenital band.

Buhl's patient was newly born and had, with the enlarged tongue, bilaterally enlarged kidneys. In addition, there were the patients of Lengemann, Eikenbusch and Tietze, who were observed at the ages, respectively, of 4 weeks, 5 months and 2 years, and had no associated anomalies.

Welzel, in his comprehensive paper, commented on the paucity of information about the prognosis of muscular macroglossia. This very question prompted our original interest in the problem. Welzel questioned whether infants and children with the condition live beyond early childhood, since the accompanying abnormalities may be incompatible with life. In analyzing the cases of type 4 macroglossia of which the reports were available to us we found that all the patients were infants or young children and the majority were under 2 years. Uniform enlargement of the fourth type was not seen in adults.

The question as to whether this abnormality may correct itself is significant and opens a wide field for speculation and continued observation, since there is not a great deal of positive evidence from which one may theorize. Helbing was of the opinion that in cases of muscular

macroglossia the enlargement proceeds slowly and may even be stationary. When our patient was close to 3 years old the tongue, to all appearances, was getting smaller; perhaps it was growing but little and the buccal cavity was developing at an accelerated rate, allowing for the accommodation of the abnormally sized tongue.[5]

Hypertrophic pyloric stenosis, according to one view, is primary congenital hypertrophy to which is added spasm, both factors operating. Some patients recover without surgical aid; the symptoms gradually abate, and by the time the patient is 6 or 8 months old all evidence of spasm has disappeared. The hypertrophy disappears less rapidly. The patient appears to "grow up to fit the enlarged pyloric musculature." Similarly, may we draw a parallel between the phenomenon occurring in our case and the possibilities for self-abatement in our patient?

The treatment for the enlarged tongue in this group has been partial removal by a wedge-shaped incision (Lengemann, Welzel, Bassetta). We feel, however, that since there is a possibility of spontaneous resolution, the advisability of active surgical measures may be questioned at this time.

SUMMARY

The available literature pertinent to muscular macroglossia is reviewed.

The advisability of clarifying the accessible reports on muscular macroglossia is stressed, and after a critical study we propose a classification comprising four types. We discuss the available information concerning each, including that on treatment.

The case of a child, approximately 2¾ years old, who had no abnormality but a huge tongue is presented. Biopsy performed at the age of 19 months showed true muscular hypertrophy. The measurements of the individual muscle fibers were compared with those of the fibers of a section obtained from the tongue of a normal child of similar age. A biometric study was also made.

The patient reported on exhibited macroglossia due to muscular hypertrophy, with no other ascertainable abnormalities. We advance some views as to the nature and the prognosis of this type of muscular macroglossia.

---

5. In a personal communication, Dr. Allen S. Brodie, of the Department of Graduate Orthodontia, University of Illinois College of Dentistry, discussed his experience with a girl first seen at the age of 5 years. This child had congenital enlargement of the tongue, which was diagnosed as lymphangioma. He instituted orthodontic treatment as well as other tongue position exercises. For two and one-half years no treatment was given, as the change from deciduous to permanent teeth was taking place. A relapse of about 50 per cent of what had been gained by treatment occurred. The tongue lay habitually on the floor of the mouth and within the teeth. It seemed to have diminished in size, "but this was probably not the case so much as that in growth the dental arches and the face had partially overtaken the tongue and the relation between the two was better."

NOTE.—Since submitting this paper for publication we have had the opportunity to study a normal boy 2 years old with a huge protruding tongue, present since birth, studded with verrucous excrescences on the dorsum and sides. The parents believed that it caused little difficulty in swallowing and feeding. A clinical diagnosis of macroglossia (lymphangioma) was confirmed by biopsy.

As the tongue has protruded since birth, the boy is now able to keep it within the confines of his mouth; this emphasizes that sufficient skeletal growth has taken place to enable the patient to accommodate the tongue.

1819 West Polk Street.

BIBLIOGRAPHY

MISCELLANEOUS

Boyd, William: Surgical Pathology, Philadelphia, W. B. Saunders Company, 1933.

Brown, G. V. I.: Oral Diseases and Malformations, Philadelphia, Lea & Febiger, 1918.

Butlin, H. T., and Spencer, W. G.: Diseases of the Tongue, London, Cassell & Co., 1900.

Cooley, J. B., in Abt, I. A.: Pediatrics, Philadelphia, W. B. Saunders Company, 1923, vol. 3, pp. 89-93.

Holt, L. E., and McIntosh, R.: Diseases of Infancy and Childhood, ed. 10, New York, D. Appleton-Century Company, 1933.

Kaiserling, C., in Henke, F., and Lubarsch, O.: Handbuch der speziellen pathologischen Anatomie und Histologie, Berlin, Julius Springer, 1928, vol. 4, pt. 2, p. 100.

Kaufmann, E.: Lehrbuch der pathologischen Anatomie, translated by Stanley P. Reimann, Philadelphia, P. Blakiston's Son & Co., 1929, vol. 1, p. 563.

Ormsby, Oliver S.: Diseases of the Skin, ed. 2, Philadelphia, Lea & Febiger, 1921.

Wolf, W.: Endocrinology in Modern Practice, Philadelphia, W. B. Saunders Company, 1936.

Antropol, W.; Heilbrunn, J., and Tuchman, L.: Enlargement of the Heart Due to Abnormal Glycogen Storage in von Gierke's Disease, Am. J. M. Sc. **188**: 354, 1934.

Balyeat, F. S.: Enlarged Tongue from Amyloidosis, California & West. Med. **43**: 154, 1935.

Eley, R. C., and Farber, S.: Hypoplasia of the Mandible (Micrognathy) as a Cause of Cyanotic Attacks in the Newly Born Infant, Am. J. Dis. Child. **39**: 1167 (June) 1930.

Frank, L. W.; Enfield, C. D., and Miller, A. J.: Carcinoma of the Tongue in Newborn Child, Am. J. Cancer **26**:775, 1936.

Friis, A.: Zur Kenntnis der Thomsenschen Krankheit (Myotonia congenita), Neurol. Centralbl. **11**:40, 1892.

von Gierke, E.: Hepato-Nephromegalia glykogenica (Glykogenspeicherkrankheit der Leber und Nieren), Beitr. z. path. Anat. u. z. allg. Path. **82**:497 (Sept. 20) 1929.

Hayashi, A.: Makroglossia congenita neurofibromata, Deutsche Ztschr. f. Chir. **118**:456, 1912.

Janse, H. M.: Macroglossia with Associated Micrognathia Causing Respiratory Difficulty, Ann. Otol., Rhin. & Laryng. **39**:99, 1930.

McDonald, S.: A Case of Circumscribed Lymphangiomatous Dilatation of Lingual Papillae, J. Path. & Bact. **36**:183, 1933.

Monnier, M. M., and Lorrain: Hypertrophie congénitale de la langue, exérèse partielle, Bull. et mém. Soc. anat. de Paris **88**:451, 1913.

Mook, W. H.: Keloid of Tongue, Arch. Dermat. & Syph. **10**:304 (Sept.) 1924.

Müller, Hans: Makroglossia neurofibromatosa congenita, Centralbl. f. allg. Path. u. path. Anat. **57**:55 (March 20) 1933.

Murphy, Douglas P.: Maternal Age at the Conception of Congenitally Malformed Child, Am. J. Dis. Child. **51**:1007 (May) 1936.

Rauh, L., and Zelson, C.: Disturbance in Glycogen Metabolism with Hepatomegaly (von Gierke's Disease), Am. J. Dis. Child. **47**:808 (April) 1934.

Robertson, H. E.: Local Amyloid with Special Reference to So-Called Amyloid Tumors of the Tongue, Ann. Otol., Rhin. & Laryng. **29**:773, 1920.

Robin, P.: Glossoptosis Due to Atresia and Hypotrophy of Mandible, Am. J. Dis. Child. **48**:541 (Sept.) 1934.

Troutt, J. M.: Case Reports of Congenital Hypertrophic Pyloric Stenosis, and Hemophilic Infiltration of Tongue, Mil. Surgeon **69**:419, 1931.

Ullrich, G.: Glossoptosis bei Mikrognathie, Deutsche med. Wchnschr. **61**:1033 (June 28) 1935.

Wagner, A.: Zur Frage der "Glossoptose," Arch. f. Kinderh. **106**:118, 1935.

GENERAL REVIEWS

Bassetta, M. A.: L'hypertrophie musculaire de la langue, Rev. d'orthop. **9**:421, 1908.

Welzel, Richard: Ueber muskuläre Makroglossie, Beitr. z. klin. Chir. **67**:570, 1910.

MUSCULAR MACROGLOSSIA

TYPE I

Abrikossoff, A.: Ueber Myome ausgehend von der quergestreiften willkürlichen Muskulatur, Virchows Arch. f. path. Anat. **260**:215, 1926.

Borst, M.: Die Lehre von den Geschwülsten, Wiesbaden, J. F. Bergmann, 1902; cited by Abrikossoff.

Dewey, K. W.: Rhabdomyoma of Tongue, Arch. Path. **3**:645 (April) 1927.
Rhabdomyoma of Tongue, Tr. Chicago Path. Soc. **12**:314, 1927.

Diss, A., and Roederer, J.: Rhabdomyoma, Bull. Soc. franç. de dermat. et syph. **34**:247, 1927.

Fujinami, Akiva: Ein Rhabdomyosarcom mit hyaliner Degeneration (Cylindrom) im willkürlichen Muskel, Virchows Arch. f. path. Anat. **160**:203, 1900; cited by Abrikossoff.

Gerhardi, P.: Ein Fall von Makroglossie, München. med. Wchnschr. **44**:1233, 1897.

Keynes, G.: Rhabdomyoma of Tongue, Brit. J. Surg. **13**:570, 1926.

Pendl, cited by Welzel and Bassetta.

Rutz, A.: Angeborenes Rhabdomyom der Zunge, Med. Klin. **22**:1072, 1926.

Weber, C. C.: Anatomische Untersuchungen einer hypertrophischen Zunge nebst Bemerkungen über die Neubildung quergestreifter Muskelfasern, Virchows Arch. f. path. Anat. **7**:115, 1854.

TYPE II

Arnheim, G.: Congenitale halbseitige Hypertrophie, Berl. klin. Wchnschr. **33**: 47, 1896.

Cohen, Hyman: A Case of Hemihypertrophy with Increased Sugar Tolerance, J. A. M. A. **69**:463 (Aug. 11) 1917.

Coston, H. R.: A Case of Congenital Hemi-Hypertrophia Totalis, M. Rec. **97**: 222, 1920.

Fortescue-Brickdale, J. M.: A Case of Congenital Hemihypertrophy, Lancet **2**:10, 1915.

Gesell, Arnold: Hemihypertrophy and Twinning, Am. J. M. Sc. **173**:542, 1927.

Lisser, Hans: Congenital Total Hemihypertrophy, J. A. M. A. **82**:1046 (March 29) 1924.

Maas, H.: Ueber Hypertrophie der Zunge, Arch. f. klin. Chir. **13**:413, 1894.

McFarland, B. L.: Hemihypertrophy, Brit. M. J. **1**:345 (March 3) 1928.

Peabody, C. W.: Hemihypertrophy and Hemiatrophy, J. Bone & Joint Surg. **18**:466, 1936.

Scott, A. J.: Hemihypertrophy, J. Pediat. **6**:650, 1935.

Trelat and Morrad, cited by Arnheim, G.: Congenitale halbseitige Hypertrophie, Berl. klin. Wchnschr. **33**:46, 1896.

TYPE III

Bronstein, I. P.: Hypothyroidism in Children, Am. J. Dis. Child. **47**:913 (April) 1934. (Also unpublished data.)

Bruck, Franz: Ueber einem Fall von congenitaler Makroglossie, combiniert mit allgemeiner wahrer Muskelhypertrophie und Idiotie, Deutsche med. Wchnschr. **15**:229, 1889.

Debré, R., and Sémelaigne, G.: Syndrome of Diffuse Muscular Hypertrophy in Infancy Causing Athletic Appearance: Its Connection with Congenital Myxedema, Am. J. Dis. Child. **50**:1351 (Dec.) 1935.

de Lange, D.: Congenital Hypertrophy of Muscles, Extrapyramidal Motor Disturbances and Mental Deficiency: Clinical Entity, Am. J. Dis. Child. **48**:243 (Aug.) 1934.

Fehleisen, F.: Ligatur beider Arteriae linguales wegen angeborenen Makroglossie, Berl. klin. Wchnschr. **24**:941, 1887.

Felsenthal, S.: Ein Fall von congenitaler Makroglossie, Arch. f. Kinderh. **14**:9, 1892.

Hall, B. E.; Sunderman, F. W., and Gittings, J. C.: Congenital Muscular Hypertrophy, Am. J. Dis. Child. **52**:773 (Oct.) 1936.

Marinesco, S.: Contribution à l'étude histopathologique du myxœdème congenital, Jahrb. f. Psychiat. u. Neurol. **5**:108, 1934.

TYPE IV

Baginsky, A.: Festschr. f. Henoch, 1890, p. 514; cited by Helbing and Welzel.

Eickenbusch, K.: Ueber muskuläre Makroglossie, Beitr. z. klin. Chir. **11**:273, 1894.

Helbing, G.: Zur Casuistik der muskulären Makroglossie, Jahrb. f. Kinderh. **41**:442, 1896.

Kitaigorodskaja, O. D.: Angeborene Hypertrophie im Kindesalter, Jahrb. f. Kinderh. **125**:38, 1929.

Lengemann, P.: Ein Fall von muskulärer Makroglossie, Beitr. z. klin. Chir. **39**: 519, 1903.

Correspondence

SCURVY WITH UNUSUAL SYMPTOM

To the Editor.—I was much interested in the article by Lowenburg, Shields, Turnoff and Ostrum entitled "Scurvy with Unusual Symptoms" (Am. J. Dis. Child. **54**:73 [July] 1937).

May I call your attention to the little volume "The Avitaminoses" by Walter H. Eddy and Gilbert Dalldorf (Baltimore, Williams & Wilkins Company, 1937)? On page 175 the authors speak of hematuria and of hematomas about the jaw or about the bones of the lower extremities; they speak of subperiosteal hemorrhages (page 176) and of skeletal hematomas (page 178), and on page 181 they state, "Radiographic diagnosis may be made in some cases before symptomatic evidence appears."

They refer to the works of Park and of Westin and describe the changes in the bone as found by roentgenographic study. M. Litten's article on "Scurvy" (in Senator, H., and Litten, M.: Diseases of the Kidneys and of the Spleen, Hemorrhagic Diseases, Philadelphia, W. B. Saunders Company, 1905, p. 718) says: *"Hemorrhage under the orbital periosteum may be the first local manifestation."*

Hyman I. Goldstein, M.D., Camden, N. J.

Abstracts from Current Literature

Biochemistry; Bacteriology, and Pathology

ESSENTIAL IMMUNIZING ANTIGEN OF THE TYPHOID BACILLUS. L. D. FELTON F. B. WAKEMAN, Bull. Johns Hopkins Hosp. **60**:178 (March) 1937.

An essential immunizing fraction of the typhoid bacillus has been isolated which is chemically polysaccharide and immunologically more active than the total weight of the acetone-extracted dried typhoid bacilli from which it is derived.

FROM THE AUTHORS' SUMMARY.

PLACENTAL IMMUNITY: A METHOD OF DETERMINING DOSAGE OF PLACENTAL GLOBULIN IN MEASLES PROPHYLAXIS (with corrections included in: J. Pediat. **10**:572 [April] 1937). S. KARELITZ, C. K. GREENWALD and A. J. KLEIN, J. Pediat. **10**:175 (Feb.) 1937.

A formula is given by means of which the dosage of whole placental globulin extract for the prophylaxis of measles may be derived. The formula is based on the finding of volume equivalents of placental extract and maternal blood serum in terms of diphtheria antitoxin. If 10 cc. of the maternal blood serum contains 1 unit of diphtheria antitoxin the amount of the corresponding placental extract which contains 1 unit of diphtheria antitoxin would be the equivalent of 10 cc. of that serum. The authors assume that blood serum obtained from a woman during labor is no different in prophylactic value from serum of any other adult immune to measles. If the dosage of adult blood serum indicated in measles prophylaxis is known, the dosage of placental extract may be calculated thus: $\frac{B}{A} \times$ known dosage of adult serum $=$ X. Here A is the number of units of diphtheria antitoxin contained in 1 cc. of placental extract, B the number of units of diphtheria antitoxin in 1 cc. of the corresponding immune serum and X the dosage of placental extract required.

The authors do not assume that diphtheria antitoxin and measles antibodies occur in parallel amounts in the placental extract, but they believe that if all the antibodies are removed by extracting all of the globulin, all of the measles antibodies as well as the diphtheria antitoxin must be in this globulin extract. If in a given case 10 cc. of maternal serum contains the same amount of diphtheria antitoxin as 10 cc. of the whole placental extract, these equivalents must also hold true for all other antibodies completely removed with the globulin.

They report the results obtained in measles prophylaxis, using sixteen different placental preparations. The dosage of each preparation was determined by finding the volume equivalents between the immune maternal serum and the corresponding placental product. Of these preparations, ten were whole globulin extracts of placentas, three were placental tissue after the fluid had been discarded and three were just placental fluid. The different preparations were injected into 174 exposed susceptible children; 166 had been exposed in their homes and 8 in a hospital ward. The results, which were judged according to the expectations in each case had immune adult serum been used in equivalent dosage, indicated that this method of measuring the dosage of the whole globulin extract of the human placenta is reliable. It is not possible to use this method of calculation when fractions of the whole globulin extract are used, for in the process of fractionation some of the antibodies are lost.

The authors carried out measles prophylaxis in 40 children with commercial placental globulin extract, adhering to the dosage recommended and in some instances increasing the dosage. Forty-one per cent of the children failed to show

amelioration of measles, indicating that the preparations were not adequate. Were the nitrogen contents of the commercial preparations increased, better results should be obtained. The authors suggest a method of determining the dosage of the commercial placental globulin extract: They determine the adult blood serum equivalent of the pooled placentas by obtaining the titer of the diphtheria antitoxin in the placental fluid squeezed from the entire batch of placentas and the titer of the diphtheria antitoxin in the complete globulin extract of the placentas and fluid combined, and these figures they apply to the formula: $\frac{B}{A} \times$ volume of whole globulin extract = adult serum. Here A is the titer of the diphtheria antitoxin in 1 cc. of the globulin extract and B the titer of the diphtheria antitoxin in 1 cc. of placental fluid. Placental fluid is substituted in this formula for adult serum since the authors have shown that diphtheria antitoxin and measles antibodies have the same titers in placental fluid as in adult blood serum.

RAUH, Cincinnati.

THE ACTION OF STRYCHNINE AND ETHYL STRYCHNINE ON NORMAL AND DISTURBED RESPIRATORY FUNCTION. M. AIAZZI-MANCINI and L. DONATELLI, J. Pharmacol. & Exper. Therap. **59**:304 (March) 1937.

Strychnine has been little used for many years as a respiratory stimulant, as the effective dose is also convulsant. Aiazzi-Mancini and Donatelli, working on rabbits, found: (*a*) that ethyl strychnine is twenty times less toxic than strychnine and (*b*) that in nonconvulsant doses it stimulates respiration, which results in a greater respiratory volume in both normal animals and in animals depressed by narcotics, anesthetics, hypnotics and carbon dioxide. Clinical trials would seem to be worth while.

PILCHER, Cleveland.

ACTION OF DRY BILE OBTAINED WITH VARIOUS SOLVENTS ON STREPTOCOCCUS ERYSIPELATIS IN VITRO. A. FARIOLI, Pediatria **45**:123 (Feb.) 1937.

Farioli reported (*Pediatria* **42**:611, 1934) on the action in vitro of fresh bile, dry bile and sodium taurocholate on Streptococcus erysipelatus. He has now tested the action in vitro of dry bile on the same organism. He has fractioned the dry bile in different solutions by means of various solvents and has found that fraction 3, so-called, of p_H 8, inhibits the growth of the germ. He concludes by stating that in the near future such chemical researches will be corroborated with clinical work.

PALMIERI, Brooklyn.

A SIMPLE METHOD FOR THE DETERMINATION OF UREA IN BLOOD AND URINE. A. C. M. LIPS, Nederl. tijdschr. v. geneesk. **81**:175 (Jan. 16) 1937.

This is a description of a simple apparatus for the accurate determination of urea and other constituents of biologic fluids in small amounts, which is based on the method of Schloesing (*Ann. de chim. et phys.* **31**:153, 1751). In correcting the apparatus already existing, for instance, that of Conway (*Biochem. J.* **28**:419, 1933), their disadvantages are removed. The method for determining urea in blood and urine is described.

VAN CREVELD, Amsterdam, Netherlands.

Metabolism; Infant Feeding; Milk and Other Foods

MECHANISM OF MILK CLOTTING: I. RÔLE OF MILK COMPONENTS IN COAGULATION. I. N. KUGELMASS, Am. J. Digest. Dis. & Nutrition **4**:170 (May) 1937.

From a series of experiments reports of which do not lend themselves well to abstracting, the following facts were arrived at:

1. Clotting of milk involves transformation of soluble caseinogen into some form of insoluble casein. With the action of rennin, calcium paracaseinate is

formed; with acid or heat, casein; and with more than one of these coagulants, a combination of these precipitates. Three constituents form the clot (caseinate, phosphate and calcium), representing but 2 per cent of the composition of milk, in the form of the largest molecular aggregates. The mechanism of the clotting of milk with rennin is similar to that of blood with thrombin, in the presence of calcium ions.

2. The rennet clotting of milk is a diphasic autocatalytic process. The first phase, which is the enzymic or digestive phase of clotting, requires about half the time to produce the curd, caseinogen being hydrolyzed into paracasein. Calcium ions are unnecessary for this stage. The second phase, which is the flocculation or active phase, marks the appearance of calcium paracaseinate as a gel or precipitate. Calcium ions are necessary only for this phase, and both phases are accelerated by hydrogen ions. Calcium ions increase the whiteness of milk prior to flocculation.

3. The rate of clotting is a direct function of the concentration of the caseinate, rennin, calcium ions and hydrogen ions; at higher concentrations the latter two prolong clotting. Diminution of any of these factors changes the character of the curd from tough to gelatinous, to flocculent and finally to gritty consistency at extreme dilutions, the curd tensions varying inversely with the clotting time.

MORRISON, Savannah, Ga.

MILK. H. W. SOPER, J. Missouri M. A. **34**:90 (March) 1937.

A review is presented of the material contained in several previous papers by the author. Besides the various milk-borne epidemic diseases, Soper mentions Haverhill fever, dysentery, poliomyelitis and brucelliasis. Special emphasis is given to gastric ulcer and to infections of the tonsils and teeth due to streptococci ingested in raw and pasteurized milk.

Professors Hooton, of Harvard University, and Bunting, of the University of Michigan, are quoted in support of the theory that dental caries is present only in peoples who are milk consumers. He cites McCollum's study on the people of the wet regions of southern Asia, who have no herds, use no milk and subsist largely on vegetables, rice and soy beans. These people, it is claimed, "are better developed physically, have more endurance . . . escape the skeletal defects in childhood and have the finest teeth of any race in the world."

Soper believes that "raw milk is unfit for human consumption" and that "pasteurized milk as it reaches the consumer usually contains pathogenic bacteria and is not to be relied upon as a safe food."

Concentrated milk of some sort will, he believes, eventually be the sole available source of milk, because of its safety and greater economy.

BERGER, Kansas City, Mo.

IRON RETENTION IN INFANCY. G. STEARNS and D. STINGER, J. Nutrition **13**:127 (Feb.) 1937.

The authors endeavored to determine the quantities of iron actually retained when babies were given various types of feedings. Fourteen healthy infants from 7 to 54 weeks of age served as subjects for the studies. One infant received breast milk; the remainder were given evaporated milk formulas. The food sources of iron were egg yolk, purée of spinach and an iron-enriched cereal. The effect of the addition of potassium carbonate or chloride to the diet on iron retention was noted.

Babies who received cow's milk alone lost about 0.05 mg. of iron daily, but the baby fed breast milk never had a negative balance. Egg yolk and spinach in the amounts given did not increase retention of iron, but retention was increased

among the babies fed the cereal. Iron retention was also increased when from 1.25 to 5 cc. of a 1 per cent solution of ferric ammonium citrate was given. A relationship between iron retention and intake of potassium, calcium or phosphorus could not be detected. When either cereal or ferric ammonium citrate was given, an ample retention of iron was noted if the intake amounted to from 1 to 1.5 mg. per kilogram per day.

MUNNS, Winnetka, Ill.

VARIATIONS OF COPPER IN THE BLOOD OF INFANTS AT DIFFERENT AGES. E. LESNÉ, P. ZIZINE and S. B. BRISKAS, Compt. rend. Soc. de biol. **121**:1582, 1936.

A method is described for the determination of the copper content of the blood. The copper content of fetal blood (at from 5 to 6 months) varied from 1.95 to 2.35 mg. per liter; that of the blood of viable premature infants, from 1.90 to 2.17 mg.; premature infants dying from dystocia or from circulatory disturbances in the umbilical cord had from 0.80 to 1.12 mg., while normal infants had from 0.73 to 1.06 mg. for ten days and then an increase to a point of stabilization at 135 mg. per liter between the first and second month.

WAHL, Cleveland.

METHODS OF EVALUATING THE NUTRITIONAL STATE OF CHILDREN. Report of the Committee on Hygiene of the League of Nations, Rev. méd.-sociale de l'enf. **5**:106 (March-April) 1937.

Realizing the importance of the problem of nutrition in young persons, the committee has attempted to outline methods of evaluation applicable to large groups of children. In their program they suggest three types of examination, to be made as indicated.

The first, a superficial one, is intended to eliminate from further examination those children who are obviously normal. It embraces observations on age, sex, body build, weight and height, the general state of nutrition, the condition of the skin, the amount and distribution of fat, the teeth and the musculature. Children who seem to be abnormal in any way are then subjected to a second type of investigation, which gains information on the alimentation, the social and familial surroundings and details of body measurements. Photography is much used. In addition, determinations are made of the hemoglobin and serum protein, and tests for deficiencies of vitamins A, C and D.

If further study seems necessary complete medical and psychologic examinations are done.

To the abstractor it appears that a complete physical examination might be done earlier in the ambitious series of procedures.

DIETRICH, Beverly Hills, Calif.

ACID AND ACIDIFIED MILKS. L. V. BLANCO, D. FUKS and R. LAUERS, Arch. am. de med. **13**:1, 1937.

A thorough discussion of acid and acidified milks, based on the accepted literature, is given by the authors. Lactic acid milk formulas are recommended as one of the most satisfactory forms of artificial feeding. The optimum concentrations, according to the authors, are from 0.4 to 0.6 per cent. Buttermilk and other similar preparations are advocated in the early treatment of prematurity, severe diarrheas, major digestive disturbances in breast-fed infants and certain stages of marasmus.

SCHLUTZ, Chicago.

CHOLESTEROL METABOLISM, WITH SPECIAL CONSIDERATION OF HYPOCHOLESTEREMIA. A. O. SCHALLY, Ergebn. d. inn. Med. u. Kinderh. **50**:480, 1936.

Disturbances in cholesterol metabolism have heretofore been considered only from the point of view of hypercholesteremia. Schally demonstrates that hypocholesteremia is worthy of consideration and that there are diseases which are regularly attended by hypocholesteremia.

Hypercholesteremia in hepatic disease is an expression of damage of the hepatic cells, in which the storage capacity is partly or entirely suppressed. The hypercholesteremia of renal disease is an endogenous disturbance of lipoid metabolism. What the author calls transport hypercholesteremia is a phenomenon coincident with circulation of fat and is therefore merely a transient or a passive condition.

Hypocholesteremia as it occurs in hepatic disease involves chiefly the ester and is an expression of severe damage of the liver. The hypocholesteremia seen in thyroid disease is a measure of the influence exercised by the thyroid gland on the diminution of cholesterol. In pernicious anemia hypocholesteremia occurs regularly; the author attributes it to a disturbance in resorption. His investigations regularly yielded hypocholesteremia in ulcerous colitis. He also found it in some diseases of the small intestine and in celiac disease, and it has been reported in certain infections, particularly tuberculosis, occasionally also in the first ten days of scarlet fever (provided the patient remained untreated with serum), in lymphogranulomatosis and in typhus. Schally then raises the question as to the rôle that cholesterol may play in the processes of immunity and suggests that cholesterol may serve the purpose of neutralizing bacterial toxins.

CAPPER, Philadelphia.

FEEDING RURAL CHILDREN. J. CZARNECKI, Zycie Dziecka **6**:70 (March) 1937.

From Czarnecki's observation the rural child is the most neglected, especially from the standpoint of feeding. The reasons for it are numerous.

In the first place the mother is too busy with the farm work, more so during the summer season. Again there is not a sufficient amount of milk on small farms throughout the year.

Thus the county stations for care of children have much to do to elevate the standard of feeding and nutrition of rural children. KRUPINSKI, Chicago.

OBESITY DURING GROWTH. P. HANSSEN, Acta med. Scandinav. **91**:435, 1937.

Five obese children were studied. In four instances other members of the family also were fat. The fat showed all the "adiposogenital" type of distribution. These children were active and felt well, and their intelligence was normal. No evidence of mental disease was found. The sugar tolerance curve was normal in four; the fifth child showed a curve with a somewhat late fall. The basal metabolic rate was normal.

KAJDI, Baltimore.

STUDIES ON THE RELATION BETWEEN HYPERAZOTEMIA AND NaCl DEFICIENCY. J. CLAUSEN, Acta med. Scandinav. **91**:523, 1937.

Factors raising the nonprotein nitrogen content of the blood in hypochloremia are dehydration through sodium chloride deficit, oliguria and circulatory disturbances, increased proteolysis and, possibly, organic lesions of the kidneys.

Experiments on patients with sound kidneys gave no evidence that hypochloremia directly causes a decrease in renal function; similarly, the renal function of patients with chronic nephritis did not change when the hypochloremia was relieved, as judged by the urea clearance test.

Clausen did not alter the chloride concentration of the serum of patients with chronic nephritis by injection of from 10 to 30 Gm. of urea.

KAJDI, Baltimore.

SPONTANEOUS HYPOGLYCEMIA WITH PECULIAR PSYCHIC DISTURBANCES. EINAR RUD, Acta med. Scandinav. **91**:648, 1937.

A 24 year old woman, in whom there suddenly developed pathologic appetite about one hour after meals, gained 15 Kg. in three months. At the same time changes in personality were observed—slovenliness, disobedience, maliciousness toward friends, impulsive acts and kleptomania.

After three months a spontaneous remission occurred, followed by another period of illness of four months, during which she again gained 18 Kg., with exacerbation of the psychic difficulties.

The blood sugar level during fasting was as low as 35 mg. per hundred cubic centimeters. Even in the dextrose tolerance test it rose only to 105 mg. The sella turcica was half the normal size.

Rud believes that the diminished function of the insulin antagonist (Houssay's diabetogenous principle of the anterior lobe of the hypophysis), rather than hyperproduction of insulin, was the cause of the disturbance. KAJDI, Baltimore.

Vitamins; Avitaminoses

THE INFLUENCE OF LACK OF VITAMIN A IN THE DIET ON THE PHAGOCYTOSIS PROMOTING PROPERTIES OF THE BLOOD SERUM. E. GELLHORN and J. D. DUNN. J. Nutrition **11**:317 (March) 1937.

Gellhorn and Dunn found that rats which revealed marked chemical signs of vitamin A deficiency might have either a decreased or an increased phagocytic index. However, as the disease progressed the index was found to decrease, which fact explains the greater susceptibility of these animals to infection than was found among those on a normal diet. It was also found that loss of weight and severity of symptoms did not run parallel to the changes in the phagocytic index and that changes in the index were completely reversible when animals deficient in vitamin A were placed on an adequate diet. MUNNS, Winnetka, Ill.

MULTIPLE NATURE OF THE VITAMIN D OF FISH OILS. C. E. BILLS and others. J. Nutrition **11**:435 (April) 1937.

Using rats and chickens, the authors assayed the effectiveness of liver oils from twenty-five species of fish and compared these oils with cod liver oil. Liver oil from the white sea-bass of California was found to be most effective, while oils from several species of tuna and the bonito, albacore and totuava were least effective. Oils from related species were found to differ widely in effectiveness.

The vitamin D in fish oil was compared with that in viosterol and irradiated 7-dehydrocholesterol. The effectiveness of viosterol was found to be lower than that of any fish oil. Irradiated 7-dehydrocholesterol was found to be about as effective as cod liver oil or irradiated ordinary cholesterol. Oil from the white sea-bass was superior to the latter two substances in its effect.

MUNNS, Winnetka, Ill.

THE ANTIRACHITIC POTENCY OF ERGOSTEROL ACTIVATED BY LOW VELOCITY ELECTRONS—A CLINICAL EVALUATION. I. MCQUARRIE, W. H. THOMPSON, A. V. STOESSER and L. G. RIGLER, J. Pediat. **10**:295 (March) 1937.

Up to the present time ultraviolet irradiation has proved to be the only practical method of converting inactive ergosterol into vitamin D. The low velocity electron process for activating ergosterol is an entirely new method and can be employed on as large a scale as may be desired. The authors have carried out a series of clinical experiments, using ergosterol activated by the low velocity electron process to determine its potency in the prevention and cure of rickets, and the preventive dose required by infants.

The curative test was carried out on eight infants with severe or moderately severe rickets. Frequent clinical and roentgenologic examination and determinations of the serum calcium and inorganic phosphorus contents were employed to discover the presence or the absence of rickets. Active rickets showed evidence of healing in all the cases within from two to three weeks and apparently complete healing by the end of from five to eight weeks of treatment, as shown by roentgen

changes in the bones and by return to normal of the calcium and inorganic phosphorus contents of the blood serum. In the first test large doses, 8,000 units, of the test substances were employed, but equally good healing responses occurred with smaller doses, from 600 to 3,000 units. Preventive tests with the activated ergosterol were made on fifty-eight full term normal infants and forty-eight premature infants, controls being twenty-six infants to whom assayed cod liver oil as the source of vitamin D was given. All these infants except two were protected. Known irregularities in the regimens of these two patients might well have accounted for these failures. The data obtained for the experimental subjects based on the roentgenographic, clinical and chemical findings and on growth were indistinguishable from those pertaining to the control series receiving cod liver oil. The authors feel from their experiments with ergosterol activated by means of low velocity electrons that the average minimal preventive dose is not above 300 U. S. P. units of vitamin D per day for full term infants and 540 units per day for premature infants.

RAUH, Cincinnati.

SCURVY AND CARDITIS. S. TAYLOR, Lancet **1**:973 (April 24) 1937.

Erdheim in 1918 showed that scurvy may be associated with cardiac lesions. Two thirds of the children who died of scurvy and were examined post mortem showed hypertrophy of the right ventricle. Numerous other investigators have found changes in the heart muscle.

This study is based on experiments with guinea-pigs. It was found that guinea-pigs suffering from scurvy showed cardiac valvulitis, myocarditis and occasionally pericarditis, often associated with gram-positive organisms, even when none had been injected. The lesions were commonest in the mitral valve, the auriculoventricular junction, the perivascular areas in the myocardium and the papillary muscles.

Intradermal injection of hemolytic or green streptococci did not increase the incidence or severity of the lesions but increased the incidence with which organisms were found in the heart.

Infected guinea-pigs kept in a state of subacute scurvy for a considerable time acquired congestion of the lungs and liver, the latter having a nutmeg appearance.

Once the lesions of the heart had developed, curing the scurvy did not remove the lesions, though it prevented the development of congestive heart failure.

LANGMANN, New York.

DEFICIENCY DISEASES: THE PREVENTION AND TREATMENT. F. F. TISDALL, Bull. Assoc. internat. de pédiat. prevent. **4**:6, 1937.

Strictly speaking, the words "deficiency disease" should not be limited to conditions caused by a lack of vitamins but should also be used to denote those disorders which follow a deficiency of any food element.

For example, secondary anemia, caused by a lack of iron in the food, or goiter, caused by a lack of iodine, are deficiency diseases. Tisdall discusses conditions most frequently classified under this head at the Toronto Hospital for Sick Children—scurvy, rickets and tetany.

AMESSE, Denver.

INFLUENCE OF CEVITAMIC ACID ON DIURESIS. R. TISLOWITZ, Compt. rend. Soc. de biol. **121**:915, 1936.

In dogs, it was found that on a fixed diet 20 cc. of urine was excreted hourly. Intravenous administration of 10 mg. of cevitamic acid per kilogram increased the output to 30, 40 and 50 cc., the increase persisting for from three to four hours.

The process is that of a dehydration of all the tissues, and the vitamin, being highly soluble in water, is easily excreted in the urine when given in excess of body needs.

WAHL, Cleveland.

INFANTILE SCURVY. P. NOBÉCOURT, Gaz. d. hôp. **110**:412 (March 31); 541 (April 28) 1937.

This is a comprehensive classroom lecture, including besides the history, clinical course, diagnosis and treatment of infantile scurvy an adequate critical survey of the recent studies concerning the etiology and pathogenesis.

KAJDI, Baltimore.

CEVITAMIC ACID (VITAMIN C) CONTENT OF VARIOUS PARTS OF THE CENTRAL NERVOUS SYSTEM AND OF PERIPHERAL NERVES. I. MĚLKA, Arch. f. d. ges. Physiol. **237**:216, 1936.

Studies of the nervous systems of rats, guinea-pigs, rabbits and calves and of the human brain gave the following results: The highest content of cevitamic acid in the human brain was observed in the pituitary gland and the cerebellum (average 0.26 mg. per gram). The cerebral cortex had an average of 0.17 mg.; the globus pallidus, 0.16 mg., and the medulla oblongata, spinal cord and white matter of the central nervous system, 0.13 mg., while peripheral nerves (sciatic nerve) had little cevitamic acid (average 0.03 mg.). In calves and rabbits the highest contents were also in the cerebellar cortex. The cevitamic acid content of the brain depends to a high degree on nutrition; it dropped to below 4 per cent of the normal value when the food was free from cevitamic acid. At 18 C. (60.4 F.) the cevitamic acid content of the human brain does not decrease within twenty-four hours after death.

SPIEGEL, Philadelphia. [ARCH. NEUROL. & PSYCHIAT.]

SEASONAL VARIATIONS OF THE VITAMIN C CONTENT OF BREAST MILK. M. KASAHARA and K. KAWASHIMA, Ztschr. f. Kinderh. **58**:191, 1936.

The vitamin C content of breast milk varies with mothers. In the same mother it shows seasonal variations, being lowest during January and February and highest during April, May and June. This variation depends on the vitamin C content of the mother's diet.

SIEMSEN, Chicago.

THE VITAMIN C CONTENT OF FOOD ARTICLES AVAILABLE FOR YOUNG INFANTS. C. SUNG and F. T. CHU, Chinese M. J. **51**:315 (March) 1937.

The custom of prolonged breast feeding seems to have protected Chinese infants against scurvy, but the authors doubt that there is a proper supply of vitamin C in the milk of mothers whose diet is low in this substance. Estimations were made of the contents of various kinds of milk and those of certain fruits and vegetables in the market available for mothers.

Determinations of vitamin C content were made by the titration method of Harris and Ray. Analyses often were repeated so as to obtain average values. Human milk contains four times the amount of vitamin C found in cow's milk, but the content may be as low as that of cow's milk if the mother's diet is deficient. Soy bean milk has little vitamin C. Tomato ranks high and is inexpensive. Juices of white turnip and kohlrabi are rich in the vitamin and widely accessible on the Chinese market. Cabbage soup prepared according to the authors' method is of value, 5 ounces (150 cc.) being the equal of 1 ounce (30 cc.) of orange juice.

NEFF, Kansas City, Mo.

LATENT SCURVY IN INFANTS: I. CAPILLARY RESISTANCE OF NEWLY BORN CHILDREN AND DURING THE FIRST YEAR OF LIFE. P. W. BRAESTRUP, Acta pædiat. **19**:320, 1937.

Although numerous investigations have been made concerning the relation between capillary fragility and scurvy, the value of determinations of capillary fragility in the detection of latent deficiency of vitamin C remains uncertain. The sole point on which all workers agree is that the capillaries are less resistant to

trauma during the first year of life than in later years. Bayer demonstrated that fragility is maximal during the second half of the first year. Ylppö found that the resistance of the capillaries varied directly with the birth weight of the infant. Many attempts have been made to correlate variations in capillary resistance with the presence or absence of occult scurvy.

In the present study capillary fragility was measured by the tourniquet method. A constant pressure of 70 mm. of mercury was applied to the upper arm for four minutes; petechiae which appeared in a 4 cm. circle stamped on the skin of the antecubital fossa were counted. Both arms were used simultaneously. This is regarded as an important point of technic because of the marked quantitative difference of the response in the two extremities. The occurrence of 10 petechiae under the circumstances described was considered to be the maximal normal response. The patients were healthy breast-fed infants whose ages varied between a few hours and 12 months. They received no added supplement of vitamin C until they were 6 months old, when potatoes and various vegetables were allowed. The number of individual determinations of fragility was approximately 400. The study was carried out in May, June and July 1936.

Capillary resistance was found to be highest in newly born infants and in those less than a month old. The degree of fragility increased up to about four or five months of life, then decreased up to the first year. The degree of fragility did not appear to bear a relation to the degree of prematurity of the patient. Eight children who showed increased fragility were given cevitamic acid: after four weeks three showed normal resistance. Vitamin C was also given to ten healthy children who exhibited lowered resistance; six of these showed normal resistance at a subsequent examination.

"Too little vitamin C is certainly a frequent cause of lowered capillary resistance in otherwise healthy infants."

McCune, New York.

Latent Scurvy in Infants: II. Content of Cevitamic Acid in the Blood Serum of Women in Labor and in Children at Birth. P. W. Braestrup, Acta pædiat. **19**:328, 1937.

Uncertainty still exists concerning the optimal concentration of cevitamic acid in the bodies of newly born infants; also, concerning the relation between the concentration in the tissues and that in the blood. The normal figures for cevitamic acid in the serum vary with the chemical method used in the determination and also with environmental circumstances. Employing the dichlorophenolindophenol titration, Gabbe found normal values of between 0.14 and 1.21 mg. per hundred cubic centimeters of serum. Using a similar method, Farmer and Abt found values in the neighborhood of 1 mg. per hundred cubic centimeters. The normal values for Danes, determined by methylene blue titration, appear to vary between 0.5 and 1 mg. per hundred cubic centimeters of serum. The values depend to a considerable degree on the amount of vitamin C in the diet.

Using the methylene blue titration method of Lunt and Lieck, the author made seventy-nine analyses of the umbilical blood of newly born infants and seventy-three estimations of cevitamic acid in the venous blood of women in labor. The values for umbilical blood varied between 0.13 and 0.85 mg. per hundred cubic centimeters of serum; the concentration was independent of the birth weight of the infant. The values for the mothers averaged 0.36 mg. per hundred cubic centimeters. The concentration of cevitamic acid in the serum of the infants was in some measure dependent on the concentration in the serum of the mothers. The values were somewhat higher for infants who were born after prolonged labor and somewhat lower for infants born during obstetrical anesthesia.

In eight cases it was found possible to increase the concentration of cevitamic acid in the serum of mothers by administration of vitamin C. The infants born of these mothers showed higher concentration of cevitamic acid in the serum than did the other infants in the series.

The conclusion is drawn that women in labor have relatively low concentration of cevitamic acid in the serum; also that the content of cevitamic acid in the

serum of the newly born infant is higher than that of the mother, although its concentration depends on that in the mother's blood. McCUNE, New York.

EXPERIMENTAL RICKETS. C. E. RÄIHÄ, E. HELSKE, H. PEITSARA and E. VEHNIÄINEN, Acta pædiat. **19**:335, 1937.

This is a long and detailed report of experiments on animals which were designed to answer the question: What is the nature of the disturbance of intermediary metabolism which results in rachitic hypophosphatemia? Rabbits were rendered rachitic by suitable measures. Under carefully controlled circumstances determinations were made of the concentrations of the various compounds of phosphorus in the muscles; these were related to the concentrations of phosphorus and calcium in the blood serum. The conclusion is expressed that the fundamental chemical phenomenon in the pathogenesis of rickets is a disturbance of the intermediary metabolism of the organic compounds of phosphorus. Specifically, this consists chiefly in an abnormal increase of hexosephosphoric acid ester in the muscles during muscular activity. In this manner, inorganic phosphorus is immobilized and rendered unavailable for the formation of the adsorbable calcium-phosphorus compound which is taken up by cartilage during the process of calcification of bone. McCUNE, New York.

RELATION BETWEEN RICKETS AND MENTAL DEFICIENCY. T. BRANDER, Finska läk.-sällsk. handl. **79**:957 (Nov.) 1936.

On somatic and psychologic examination of 375 children of premature birth, ranging in age from 7 to 15 years, Brander found that in the group with grave traces of early rickets there was greater frequency of feeblemindedness and states bordering on feeblemindedness and ordinary stupidity, while the number of normal and talented children was correspondingly less. Since the defects in intelligence were of relatively mild degree, he concludes that rickets can hardly be of practical significance in the etiology of oligophrenia. There was no evidence for or against rickets as leading to lasting mental deficiency of mild degree, but both rickets and defective mental development may have the same cause—for example, premature birth. It seems fairly certain to the author that mental deficiency in itself promotes the origin of rickets.

EDITOR'S ABSTRACT. [J. A. M. A.] [ARCH. NEUROL. & PSYCHIAT.]

Hygiene; Growth and Nutrition; Public Health

FETAL AND NEONATAL MORTALITY WITH RECOMMENDATIONS FOR REDUCTION. F. L. ADAIR and E. L. POTTER, Am. J. Pub. Health **26**:281 (March) 1936.

Although in the last twenty years there has been a marked decrease in the death rate of children under 1 year of age, there has been a smaller decrease in the death rate for infants in the first two weeks of life. There has been practically no change in the rate of stillbirths since vital statistics on this subject began to be collected.

The causes of death are best divided into antepartum, intrapartum and postpartum causes. Ante partum, placental abnormalities, compression of the cord, developmental abnormalities in the fetus and diseases of the mother incident to pregnancy are the most common causes; intra partum, trauma with resulting intracranial hemorrhage is responsible for the majority; post partum and in the neonatal period prematurity and trauma sustained at birth are the most common causes of death.

An attempt to lower the neonatal death rate cannot be made without an attempt also to lower the stillbirth rate, for both are frequently linked with the same fundamental causes.

The main points to be stressed in attempting to prevent antenatal, intranatal and neonatal deaths are: better prenatal hygiene, immediate and appropriate treatment

of toxemias, correction of malpresentations, appropriate treatment in cases of contracted pelvis, prevention of the onset of labor until as near term as possible, more skilled obstetric technic and better immediate care of the new-born child, especially the one born prematurely. McBryde, Durham, N. C.

Reducing Infant Mortality. H. C. Niblack, Illinois M. J. **71**:109 (Feb.) 1937.

In this report Niblack discusses the means that have been used in Chicago to solve the problem of the mortality of the new-born, particularly that of infants born prematurely. In the beginning he presents charts which illustrate the decline of infant mortality in Chicago during the past thirty years as well as the various causes of death during the first year of life. These tables show that contrary to previous years the present era shows that the majority of deaths occur in children under 1 year of age and that these deaths are due to either natal or neonatal causes. The chief neonatal causes are prematurity and respiratory diseases. The rest of the paper consists of a description of the program which is being carried out in Chicago to reduce deaths from prematurity. Barbour, Peoria, Ill.

Malnutrition and a C3 Population. F. M. Spencer, New Zealand M. J. **36**:4 (Feb.) 1937.

Since there had been much reference in the press to malnutrition among New Zealand school children, Spencer conducted an investigation of the records of the School Dental Service and School Medical Service and found that the implication was true. From 1931 through 1935 the records showed the percentage of malnourished children varying between 5.48 and 6.6. Among the causes listed were: heredity, diet, fatigue, chronic infections, carious teeth. Examining the records, Spencer concluded, among other things, (1) that malnutrition in children is by no means solely a matter of poverty, (2) that health education should be intensified among parents and children, privately and publicly, and (3) that malnutrition is a condition which does not suddenly arise at school age but begins in infancy and gathers momentum until it causes anxiety or is noted in physical examination. Mulherin, Augusta, Ga.

Two Examples of Health Centers. Gonse-Boas, Rev. méd.-sociale de l'enf. **5**:127 (March-April) 1937.

An unenlightening comparison is given of the organization of two health centers, one at Peckham, England, and the other at Courbevoie, France.

Dietrich, Beverly Hills, Calif.

Infant Mortality in the Sudentenländern. V. Kindermann, Med. Klin. **33**:694 (May 21) 1937.

Illegitimacy, employment of mothers in industry and more particularly early weaning are considered most important etiologic factors in the high infant mortality. The death rate was definitely higher among male than among female infants. In combating the high mortality, special measures, such as proper care for illegitimate mothers and infants and discontinuance of the mother's work in industry from two to three months before childbirth, are necessary. Also the propaganda for breast feeding must be renewed. Siemsen, Chicago.

Prematurity and Congenital Deformities

Oxycephalus: Premature Synostosis of the Cranial Sutures. A. E. Bennett, J. J. Keegan and H. B. Hunt, J. Nerv. & Ment. Dis. **84**:274 (Sept.) 1936.

Little information is available in the literature on the surgical treatment of oxycephalus. Von Graefe and MacKenzie were the first to call attention to

premature closure of the coronal and sagittal sutures causing anteroposterior shortening of the skull and the so-called tower, or steeple, skull. The specific etiology is unknown. The disease is congenital but rarely familial and is associated with other congenital defects, such as syndactyly and hemolytic icterus.

The authors report two cases in which examination was made before there had been permanent damage to the optic nerves from intracranial pressure. Successful surgical results were obtained in the first case, that of a boy of 4 years, by a combination of temporal decompression and crucial craniectomy, and in the second case, that of a girl of 3½ years, by circular craniectomy after the method of Bauer. While operation was performed late mentality improved and vision was saved in both these children. The authors believe that intervention is preferably instituted in the first year of life, when the cranial bones are thinner and more pliable and before intracranial pressure has produced atrophy of the optic nerve.

HART, New York. [ARCH. NEUROL. & PSYCHIAT.]

CONGENITAL ABSENCE OF THE PECTORAL MUSCLES. E. D. IRVINE and J. B. TILLEY, Arch. Dis. Childhood **12**:123 (April) 1937.

Four patients exhibited congenital absence of the pectoral muscles to a varying degree. These four were observed in routine examination of 15,000 school children.

KELLY, Milwaukee.

CLEIDO-CRANIAL DYSOSTOSIS. R. C. JEWESBURY, Proc. Roy. Soc. Med. **30**:882 (Feb.) 1937.

The case reported was that of an only child aged 6 years. Only the sternal ends of the clavicles could be palpated. There was a large anterior fontanel and a depression was felt over the posterior. Reproductions of photographs of the boy and of the x-ray pictures showing the absence of both clavicles and of portions of the skull accompany the report.

WILLIAMSON, New Orleans.

COMPLETE TRANSPOSITION OF VISCERA. G. H. NEWNS, Proc. Roy. Soc. Med. **30**:884 (Feb.) 1937.

The case reported was that of a boy aged 6 years. Reproductions of an x-ray picture of the chest showing dextrocardia and an x-ray picture taken after a barium sulfate meal showing the stomach on the right side accompany the report.

WILLIAMSON, New Orleans.

A CASE OF ACROCEPHALOSYNDACTILISM IN THE NEW-BORN. I. H. ALANTAR, Arch. de méd. d. enf. **40**:171 (March) 1937.

An infant of 20 days was brought to the University Clinic of Istanbul, suffering from the congenital malformation described by E. Apert in 1906. The deformity consisted of acrocephaly, or oxycephaly, with complete union of the fingers of each hand and the toes of each foot. As in mongolism, these malformations are always congenital. Acrocephaly and syndactilism may occur separately, and either one may be associated with some other anomaly, such as the cleidocranial dysostosis of Scheuthauer. If Apert's syndrome is combined with dystrophia adiposogenitalis, it is referred to as the Bardet-Biedl syndrome.

Sixty cases of the disorder under discussion have thus far been reported.

AMESSE, Denver.

CHANGES IN THE TRANSPLANTED ECTOPIC FETUS. A. PONSOLD, Virchows Arch. f. path. Anat. **297**:425, 1936.

In ectopic pregnancy the fetus that escapes into the peritoneal cavity may undergo mummification, skeletonization or calcification (lithopedion). No satis-

factory explanation of these varying end-results has been offered. To approach a solution of this problem experiments were made in which one fetus of a guinea-pig was transplanted into the peritoneal cavity of the mother animal from whose uterus it had been removed (autotransplantation). In each instance another fetus was removed and preserved for comparison later with the retained fetus; the undisturbed intra-uterine fetuses developed to full term and were delivered normally. In some experiments the free fetus alone was transplanted; in others, the intact membranes with their contained fetus. The transplanted fetuses varied in length from 3 to 10 cm. and in weight from 2 to 40 Gm. The periods of retention of the transplanted fetuses varied from three weeks to one and one-half years. When the free fetus was transplanted, the omentum quickly became adherent to it, and the fetus was surrounded by a vascularized connective tissue membrane. The soft parts of the fetus were absorbed, leaving only the skeleton (skeletonization). When the intact sac with its contained fetus was transplanted, no adhesions formed between the sac and the surrounding tissues. The amniotic liquid was slowly absorbed; the fetus did not become macerated, but only partly dehydrated. The dehydration the author considers an early stage of mummification. Complete mummification and calcification did not occur, these processes evidently requiring a longer time than the maximal duration of the experiments.

SCHULTZ, Evanston, Ill. [ARCH. PATH.]

RELATION BETWEEN BODY WEIGHT AND BODY LENGTH IN THE PREMATURE INFANT WITH A BODY LENGTH LESS THAN 50 CM. H. DOLLINGER, Ztschr. f. Kinderh. **58**:303, 1936.

The records of 2,000 premature infants were studied with reference to the relation between body weight and body length, and a curve was constructed. The curve shows a sharper incline above 40 cm. than below. Below 39 cm., a 1 cm. increase in length corresponds to an increase in weight of between 40 and 70 Gm.; from 40 to 44 cm., a 1 cm. increase in length corresponds to an increase in weight of between 100 and 145 Gm., and from 44 to 49 cm., a 1 cm. increase in length corresponds to an increase in weight of 200 Gm. The values for most twins exceed the average.

SIEMSEN, Chicago.

New-Born

NON-OBSTRUCTIVE PERIODIC CYANOSIS OF THE NEW-BORN INFANT (THE CYANOTIC SPELL): A CLINICAL STUDY. W. R. SHANNON, Arch. Pediat. **54**:131 (March) 1937.

The theory is advanced that periodic attacks of cyanosis in the newly born are frequently the result of hyperventilation. In support of his theory Shannon submits sixteen case histories. Tetany of the newly born is reported to have existed in each instance. Determinations of the calcium content of the blood in three cases are reported. Treatment included the administration of parathyroid extract, calcium gluconate and 5 per cent carbon dioxide in oxygen.

ORR, Buffalo.

SPONTANEOUS PNEUMOTHORAX OF THE NEWLY BORN. P. E. ROTHMAN, Arch. Dis. Childhood **12**:119 (April) 1937.

A case of pneumothorax of the newly born, with the initial symptoms occurring shortly after birth, is presented. The condition could not be attributed to either a mechanical or an infectious factor. The administration of oxygen was the only therapeutic procedure used. A spontaneous recovery ensued.

KELLY, Milwaukee.

CONJUNCTIVOPALPEBRAL TUMOR (DERMOLIPOMA) OF EXCEPTIONAL DEVELOPMENT IN A NEW-BORN INFANT. M. A. DOLLFUS, Bull. Soc. d'opht. de Paris, October 1936, p. 598.

In an otherwise normal new-born infant a pedunculated tumor was noted outside the outer canthus. It was red at birth but on twisting of the pedicle assumed a violet color. It was the size of a large olive, regular, palpable and mobile on the cheek. The conjunctival stalk appeared to have its origin in the cul-de-sac, but a few strands continued to within a millimeter of the corneal limbus. Pathologic examination confirmed the clinical diagnosis of dermolipoma, as the many and various blood vessels, the sebaceous glands and other dermal elements would testify. A drawing is included. The exceptional size and location are the cause for the report.

MAYER, Chicago. [ARCH. OPHTH.]

ERYTHROBLASTOSIS IN THE NEW-BORN WITH CONGENITAL EDEMA. F. PARADISO and C. GRILLO, Riv. di clin. pediat. **35**:264 (March) 1937.

A case is reported of a child who was born with marked edema and who died forty-six hours after birth. At autopsy, in addition to the subcutaneous edema, there were seen effusions into the peritoneum, pleura and pericardium. The blood picture was characterized by hyperchromic macrocytosis and marked erythroblastosis.

HIGGINS, Boston.

DRY GANGRENE OF THE FOOT IN A NEW-BORN INFANT. N. L. BLOISE, Arch. de pediat. d. Uruguay **7**:467 (Oct.) 1936.

A 2,600 Gm. full term infant on the third day after a normal birth presented cyanosis, coldness and absence of arterial pulsation in one foot. The condition became progressively worse until dry gangrene of the toes ensued. Three weeks later there was spontaneous amputation of the phalanges, with subsequent recovery up to three years later. During this illness the infant had a trace of albumin in the urine, the blood sugar was normal, and the Wassermann reaction was negative. The mother, however, was syphilitic, with serologic tests positive, and had received only irregular treatment during her pregnancy. For this reason Bloise attributes the gangrenous process to vascular changes of syphilitic origin.

SCHLUTZ, Chicago.

PAROXYSMS OF APNEA WITH CYANOSIS IN A NEW-BORN INFANT WITH INTRACRANIAL HEMORRHAGE. N. L. BLOISE, Arch. de pediat. d. Uruguay **7**:486 (Oct.) 1936.

One hour after birth, a new-born infant of healthy parents had an attack of apnea with cyanosis and flaccidity (muscular hypotonia). Subsequently similar attacks terminated fatally. Several hours elapsed between attacks, and during these intervals the infant appeared normal except for slight drowsiness. Lumbar puncture was diagnostic of intracranial hemorrhage. The delivery had been spontaneous though somewhat prolonged, and there was a vertex presentation. There was no postmortem examination.

Bloise believes that the majority of neurologic disturbances dating from early infancy are the result of trauma sustained at birth, which may occur in any type of labor.

SCHLUTZ, Chicago.

MANAGEMENT OF FRACTURE OF THE UPPER PART OF THE ARM IN THE NEW-BORN INFANT. F. A. WAHL, Ztschr. f. Geburtsh. u. Gynäk. **114**:82 (Dec.) 1936.

In view of the poor results obtained in many cases with the use of the high cross bar as a method of immobilization in fracture of the humerus in the newborn infant, the authors recommend the use of a light aluminum splint of a different

form. It is somewhat L shaped, and by its use the affected arm is held with the upper arm in adduction and the forearm extending directly anterior at a right angle to the upper arm. Marked improvement in results is claimed for this splint.

ADAIR and POTTER, Chicago.

AN ANTHROPOLOGIC STUDY OF THE SKULL OF THE NEW-BORN INFANT. M. JELÍNEK-VOLÍČEK, Ztschr. f. Geburtsh. u. Gynäk. **114**:271 (April) 1937.

Investigation of the diameters of the head at birth and for varying lengths of time afterward shows that the form of the infant's head is similar to that of the parents unless a contracted pelvis or other abnormality produced marked molding of the head. In such a case, the head reverts to its normal shape soon after delivery.

In general, at birth the head of a boy and that of a girl are of equal height and breadth but the girl's head is shorter anteroposteriorly. This difference becomes more marked in postnatal life. The infants of multiparas and primiparas show the same general head form. The relative measurements of the skull do not show a difference in breech and cephalic presentations. Twins from a single ovum show identical head form.

ADAIR and POTTER, Chicago.

CALCIUM AND PHOSPHORUS CONTENT OF CORD BLOOD IN THE NEWLY BORN. T. BANG, Acta pædiat. japon. **43**:408 (March) 1937.

Bang reports the following observations on seventy-seven newly born infants: 1. The average quantity of the inorganic phosphorus in the blood of the umbilical cord (as determined by Brigg's method) was 5 mg. per hundred cubic centimeters, and the average quantity of calcium (as determined by the Kramer-Tisdall method) was 10.18 mg. 2. The venous blood of the mothers, obtained simultaneously with the blood of the umbilical cords of their infants, showed a lower average value (3.4 mg. per cent) for phosphorus but normal values for calcium. 3. Although definite hypophosphatemia (3.9 mg. of phosphatase per hundred cubic centimeters) was observed in only two infants, no demonstrable signs of rickets were present on roentgenologic or clinical examinations. 4. Bang concludes that, according to these observations, no consistent relations exist between the serum phosphorus content and congenital craniotabes.

KATO, Chicago.

Acute Contagious Diseases

SOME PRACTICAL CONSIDERATIONS IN B. PERTUSSIS VACCINE PREPARATION. G. ELDERING and P. L. KENDRICK, Am. J. Pub. Health **26**:506 (May) 1936.

The addition of proteose or neopeptone to the base of the Bordet-Gengou medium has been found to increase the growth of Bacillus pertussis, thereby increasing the yield for vaccine. Other factors which have been found to influence the yield favorably are the use of a heavy inoculum for seeding and an incubation period of seventy-two instead of the usual forty-eight hours.

Comparative tests indicate some decrease in the ability of suspensions more than a year old to produce agglutinins in rabbits, compared with relatively fresh suspensions. No particular difference due to age is indicated by opsonocytophagic tests. Information is lacking as to the correlation with protective power.

Mention is made of a small group of cases of whooping cough in which B pertussis was not isolated; the organisms isolated had certain characteristics of B. pertussis but were definitely related to Bacillus bronchisepticus. The question is raised as to the possible significance of these cultures with respect to specific immunization.

For standardization of the final product, it is suggested that under the specified conditions comparisons of turbidity with a graded series of dilutions of a standard suspension give relatively uniform and reliable results. In the testing of the final

product for sterility, the use of plates of pertussis vaccine medium and of blood agar in addition to the usual sterility broth is suggested.

From the Authors' Summary. [McBryde, Durham, N. C.]

Active Immunization Against Whooping Cough: Interim Report of the Cleveland Experience. J. A. Doull, G. S. Shibley and J. E. McClelland, Am. J. Pub. Health **26**:1097 (Nov.) 1936.

Using a vaccine similar to that of Sauer and employing the same dosage, the authors administered pertussis vaccine to 483 children between 6 and 15 months of age. Only 61 children did not receive the full dosage, 80,000,000,000 organisms. As controls, they selected 496 children of comparable ages in the same neighborhoods. They carefully observed both groups to the age of 15 months and visited those over this age once every four weeks. All inoculations were given between June 1934 and July 1935. From June 24, 1934, to Sept. 12, 1936, there occurred 61 attacks of pertussis among those inoculated and 71 among the controls. Allowing three months to elapse between completion of inoculation and enrolment in the inoculated group showed no significant advantage to the inoculated. Physicians who saw representative attacks considered those occurring in inoculated children to be milder.

McBryde, Durham, N. C.

Response of the Leukopoietic System to the Toxins of the Whooping Cough Bacillus. M. M. Morris, Arch. Pediat. **54**:63 (Feb.) 1937.

Young male rabbits were inoculated intravenously with Cutter's old pertussis vaccine, Kreuger's endotoxin and a forty-eight hour culture of living pertussis organisms, respectively. Leukocytic and differential counts were made previous to the injections, and second counts, an hour later. The initial dose of organisms was 375,000,000. The injections were given on alternate days, and the dose was increased rapidly until the tenth injection, after which it remained constant for the next fifteen injections.

Relatively high leukocytic counts followed the injections of whooping cough vaccine and of live organisms, but they were no higher than the counts that follow injections of any foreign protein. An absolute lymphocytosis was always present.

The pathologic changes were suggestive of overactivity of the blood-forming elements in response to the constant influence of a foreign substance.

In the tables submitted, Morris does not indicate what the leukocyte counts were prior to the injection of the vaccine.

Orr, Buffalo.

The Prophylaxis of Scarlet Fever: A Critique. J. M. Rector, Arch. Pediat. **54**:125 (March) 1937.

Passive immunity to scarlet fever may be successfully accomplished by the intelligent administration of a number of products; the most desirable at present is pooled convalescent serum.

There is no method of active immunization that is entirely satisfactory. Because of the controversial aspects, active immunization should not be pushed as a public health measure. Its use should be largely confined to hospital attachés and children in institutions.

Orr, Buffalo.

A Milkborne Scarlet Fever Epidemic. Health News **14**:23 (Feb. 8) 1937.

An explosive epidemic of scarlet fever appeared in Oswego, N. Y., in December 1936; 511 cases occurred, 7 of which terminated in death. The epidemic was traced back to raw milk from a cow with acute mastitis. The milk from the affected quarter of this cow contained hemolytic streptococci. The epidemic subsided promptly following introduction of pasteurization. Seventy per cent of the patients were over 15 years of age.

Aikman, Rochester, N. Y.

DURATION OF IMMUNITY FOLLOWING DIPHTHERIA PROPHYLAXIS. F. G. JONES, J. Lab. & Clin. Med. **22**:576 (March) 1937.

In a study of diphtheria immunization Jones found that alum precipitated toxoid was the most effective agent available. Next to it in efficiency was toxoid and last toxin-antitoxin. The duration of immunity is about the same regardless of the agent used.

McMURRAY, Galveston, Texas.

PROBLEMS OF SCARLET FEVER. G. ZUELZER and W. ZUELZER, M. Rec. **145**:149 (Feb. 17); 197 (March 3) 1937.

In their summary the authors state:

"1. A review of experimental and clinical data shows that the streptococcal etiology in scarlet fever is unsatisfactory.

"2. The diagnosis of scarlet fever can be made in the prodromal stage.

"3. Before the outbreak of exanthemă, quinine is able to check, as a rule, the disease as well as the complications, rendering innocuous the scarlet fever virus. Quinine does not act directly upon streptococci so that another etiological factor must be considered in scarlet fever.

"4. Masked or nonexanthematic scarlet fever can be diagnosed upon certain criteria.

"5. Masked or nonexanthematic scarlet fever is frequent and exists in an acute, subacute and latent form; age is significant in the development of these various forms.

"6. Latent scarlet fever may become manifest under the influence of trauma. This mechanism is held responsible for surgical scarlet fever.

"7. Latent scarlet fever is able to promote a number of secondary diseases—endocarditis, tuberculosis, nephritis.

"8. The nonexanthematic forms of scarlet fever can be checked by quinine at any stage."

WILLIAMSON, New Orleans.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES. Pub. Health Rep. **52**:209 (Feb. 19) 1937.

In the period from Jan. 3 to 30, 1937, there was an epidemic of influenza in all sections of the United States. It compared with that of the winter of 1932-1933. Over 100,000 cases of influenza in excess of the seasonal expectancy were reported. Smallpox was unusually prevalent in the North Central regions. The incidence of smallpox for the country as a whole has shown an increase since 1934. There were 23,617 cases of scarlet fever and 542 cases of meningitis. This is about normal. The incidence of typhoid was normal, and that of measles and that of diphtheria were below normal. The mortality from all causes was 15.2 per thousand. This is an excess of 2 per thousand over the corresponding periods of the last three years. It is presumed that the increase is to be accounted for by the extremely high death rate among persons with influenza and pneumonia.

SANFORD, Chicago.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES. Pub. Health Rep. **52**:325 (March 19) 1937.

Influenza was epidemic in various sections of the country throughout the months of January and February 1937; 37,000 cases were reported for the week of January 24 to 30—an excess of 35,000 cases over 1934. For the period of January 31 to February 27 there was a decrease in every section of the country. The peak of mortality was in the first week of January. Since then there has been a decline.

Smallpox continued at a high level, and there was the usual seasonal increase in scarlet fever (26,877 cases). Meningococcic meningitis, typhoid, measles and diphtheria continued to be low. The mortality from all causes was 14.3 per thousand, which is higher than in the last corresponding three year period.

SANFORD, Chicago.

TYPES OF C. DIPHTHERIAE IN CAPETOWN. J. WRIGHT, Brit. M. J. **1**:259 (Feb. 6) 1937.

In a study of diphtheria in the City Hospital for Infectious Diseases, Capetown, 109 strains of Corynebacterium diphtheriae were isolated. All fermented dextrose but not saccharose and with 1 exception were virulent, as shown by intracutaneous tests on guinea-pigs. They were then classified in the seven types which are already known and an eighth type which hitherto has been unclassified. According to clinical severity they were grouped as very mild, mild, moderately severe and severe. The bacteriologic type is given according to instance in each one of these clinical groups, and the findings are summarized as follows:

1. The 109 strains of C. diphtheriae were classified as to type as follows: 53.2 per cent, type I; none, type II; 6.4 per cent, type III; 22 per cent, type IV; 0.9 per cent, type V; none, type VI, and 4.6 per cent, unclassified. An additional type (type VII) was introduced, since 12.9 per cent were of the mitis type in colony form and in growth in broth but fermented starch and glycogen.

2. The mildness of diphtheria in Capetown was in agreement with the circumstance that the predominant strain was of the mitis type. The sparsity of cases of severe diphtheria made the figures too few to correlate gravis strains with the severity of the disease.

3. An interesting feature of the findings was the comparatively high percentage of strains of type IV—i. e., the nonstarch-fermenting virulent gravis type, and of type VII, the starch-fermenting virulent mitis type.

ROYSTER, University, Va.

TREATMENT OF MENINGITIS WITH MENINGOCOCCAL ANTITOXIN. J. A. BROCKLEBANK, Brit. M. J. **1**:857 (April 24) 1937.

Brocklebank reports on four patients with meningitis who were successfully treated at the Kingston and District Hospital by meningococcus antitoxin, known as the Ferry antitoxin or serum. These four patients were treated with the serum. They all had a pathologic condition, but only two had proved meningococci in the spinal fluid. The series is too short to warrant any conclusion therefrom.

ROYSTER, University, Va.

ENCEPHALITIS IN MEASLES. G. A. E. BARNES, J. C. BLAKE, J. C. HOGARTH and M. MITMAN, Lancet **1**:687 (March 20) 1937.

Encephalitis as a complication of measles occurs at all ages and apparently bears no relationship to the severity of the attack of measles. The time of onset is usually at the end of the eruptive period, between the third and the seventh day of the rash.

The initial general symptoms vary from a mild degree of apathy or irritability to a profound stupor or delirium. Convulsions are common and are general. Muscular rigidity is frequent. Various clinical types of the disease have been described.

Five cases are here recorded in detail. All the patients showed involvement of the sphincter of the bladder. One death occurred, and the postmortem observations are recorded. In one case the condition closely simulated epidemic encephalitis. The patient was successfully treated with convalescent measles-encephalitis serum.

LANGMANN, New York.

ENCEPHALOMYELITIS IN SCARLET FEVER. R. MARTIN and P. CHAMPION, Arch. de méd. d. enf. **40**:84 (Feb.) 1937.

The appearance of encephalomyelitis in the course of, or during the convalescence from, scarlet fever is infinitely more rare than a similar complication of measles or varicella. Such an invasion is reported in minute detail in a case of scarlatina affecting a boy of 6½ years. Within twenty-four hours after the exanthem was noted, symptoms of diffuse meningo-encephalitis developed; there were typical signs of involvement, as represented by headache, vomiting, fever, somnolence deepening into coma, and finally convulsive seizures. The spinal fluid was under great pressure, with hyperalbuminosis and moderate increase of the cell count, which at first showed 80 per cent lymphocytes and 20 per cent polymorphonuclears, rapidly changing to pure lymphocytosis.

On the fourth day there was marked amelioration, and complete return to health, without sequelae, followed within two weeks.

A review of the literature with a discussion of the pathogenesis follows.

AMESSE, Denver.

ACTIVE IMMUNIZATION AGAINST WHOOPING COUGH. N. SILVERTHORNE, D. T. FRASER and A. BROWN, Bull. Assoc. internat. de pédiat. prevent. **4**:3, 1937.

At present, there is no conclusive evidence that an immunizing agent against whooping cough has been found. Following the method of Sauer, these Canadian pediatricians have vaccinated 127 infants and children during the past two years. In this group there have been 4 who were indirectly exposed and 11 directly exposed to pertussis; none of these contracted the disease. Evidence presented from the literature and from personal experience seems to warrant further observations on active immunization.

AMESSE, Denver.

CHRONAXIOMETRIC STUDIES OF EXPERIMENTAL DIPHTHERITIC PARALYSIS IN GUINEA-PIGS. D. V. GABBI, Arch. ital. di pediat. **4**:551 (Dec.) 1936.

Working in the Institute of Pediatrics of the University of Bologna, Gabbi investigated the excitability and chronaxia of various muscles of guinea-pigs in which paralysis had been produced by injection of diphtheria toxin. In five normal guinea-pigs the following mean values were obtained:

Anterior tibial muscle	σ .26
Adductor major muscle	σ .24
Medial adductor digiti muscle	σ .28
Peroneal muscle	σ .19
Gemellus muscle	σ .37

During the paralytic period these values were greatly increased, in one instance even to σ 4.00. Ten days after the disappearance of the paralysis there was still a significant increase; by the forty-fifth day, the values were nearly normal. These findings confirm the persistence of the chronaxial alterations observed in children after the clinical course of diphtheria intoxication.

DOOLEY, New York.

TREATMENT OF DIPHTHERITIC LARYNGITIS. G. TRON, Riv. di clin. pediat. **35**:35 (Jan.) 1937.

Tron emphasizes the advantages of intubation over tracheotomy in the treatment of laryngeal diphtheria. It is a distinct help to resort to direct laryngoscopy, because removal of the membrane may be possible.

HIGGINS, Boston.

DIPHTHERITIC CONJUNCTIVITIS IN AN INFANT. C. GIANELLI and M. E. MANTERO, Arch. de pediat. d. Uruguay **7**:483 (Oct.) 1936.

An 11 day old infant showed marked edema of the eyelids, with a profuse purulent blood-streaked discharge. She had no coryza or pharyngeal involvement. The condition was treated as gonorrheal ophthalmia at first, without results. Then a pseudomembrane appeared, and coryza developed, with a serosanguineous discharge. The Klebs-Löffler bacillus was found, and the patient was treated successfully with serum.

SCHLUTZ, Chicago.

WHOOPING COUGH. R. OISIOVICI, J. de pediat., Rio de Janeiro **4**:56 (Feb.) 1937.

A general discussion is given of the etiology, pathology and treatment.

SANFORD, Chicago.

IS THE DISEASE PICTURE OF SO-CALLED "MALIGNANT DIPHTHERIA" CAUSED ONLY BY DIPHTHERIA BACILLI? H. KNAUER, Med. Klin. **33**:289 (Feb. 26) 1937.

Illnesses which take the form of malignant diphtheria may be characterized by persistently negative cultures for diphtheria. According to von Bormann's work, a mixed infection of diphtheria bacilli and other organisms, especially streptococci, is very probable. Knauer described a case of "malignant diphtheria" which developed during convalescence from aphthous stomatitis and thinks the latter condition led to local loss of resistance which permitted the development of a severe throat infection. Cultures for diphtheria bacilli were negative. Treatment with diphtheria antitoxin (serum), "symbiosis serum" and neoarsphenamine was followed by recovery. Knauer stresses the value of neoarsphenamine and states that it is tolerated in large doses.

SIEMSEN, Chicago.

PARALYTIC MANIFESTATIONS IN SMOOTH MUSCLE IN GUINEA-PIGS POISONED WITH DIPHTHERIA TOXIN. P. BAMBERGER and H. E. NEVER, Ztschr. f. Kinderh. **58**:336, 1936.

This article is the third of a series by Bamberger and his co-workers on the pathogenesis and the therapy of malignant diphtheria in this number of the *Zeitschrift für Kinderheilkunde*.

In this article they report definite damage to the gastro-intestinal tract, as regards both motility and secretion. This finding may be related to the vomiting observed in severe diphtheria in human beings. A combination of an extract of adrenal cortex and vitamin C, which Bamberger had previously found to be of definite therapeutic value, caused improvement in the disturbed gastro-intestinal motility.

SIEMSEN, Chicago.

DOES THE CLINICAL COURSE OF DIPHTHERIA CORRESPOND TO THE TYPE OF BACILLI FOUND? M. KLABUKOWSKA, Pedjatrja polska **16**:319 (Sept.-Oct.) 1936.

Klabukowska investigated 107 cases of diphtheria, grave in 55 per cent and mild in 52 per cent. Of the group with the grave type 61.8 per cent were girls, and 38.2 per cent boys; 78.2 per cent were gentiles, and 21.8 per cent Jews. The average age was 4 years. From this group 45, or 81.8 per cent, got well; 10, or 18.2 per cent died. However, in the group with mild diphtheria there were 52 patients; 47.7 per cent were girls, and 50 per cent were boys; 57.7 per cent were gentiles and 43.3 per cent were Jews. The average age was 5.4 years. From this group 50 children got well, or 96 per cent, and 2 died, or 3.9 per cent.

The author comes to the conclusion that the type of Bacillus diphtheriae does not correspond to the clinical course of the diphtheria, for in her cases more complications were associated with mild than with grave diphtheria. In this observation she does not agree with the English investigator, Anderson. However, some weight must be placed on the type of bacilli found in diphtheria and its prognostic importance.

KRUPINSKI, Chicago.

THE FIGHT AGAINST DIPHTHERIA. H. PEETERS, Maandschr. v. kindergeneesk. **6**:282 (April) 1937.

Peeters reviews the results obtained in Amsterdam by application of a concentrated anatoxin for diphtheria. The advantages of this concentrated product are that two injections are sufficient instead of the three formerly required, and the secondary reactions are very slight. Among 208 children with a positive Schick reaction, the reaction had become negative in 185 after the injection; 15 children showed a negative result with a pseudoreaction, and only 8 showed a positive Schick reaction. Comparison with other anatoxins showed: Of 9,518 children immunized with the ordinary anatoxin of Utrecht during 1931-1934, 12 contracted diphtheria. Of 1.025 children immunized with Pasteur anatoxin, none contracted diphtheria. Of 5,534 children immunized with the concentrated anatoxin, only 2 contracted diphtheria.

VAN CREVELD, Amsterdam, Netherlands.

Acute Infectious Diseases

INCIDENCE AND SEVERITY OF HOOKWORM INFESTATION IN EAST TEXAS. R. G. UPTON, Am. J. Pub. Health **26**:924 (Sept.) 1936.

Examination of stool specimens from 1,883 school children in five counties of the eastern part of Texas showed 35 per cent of the white children and 1.5 per cent of the colored children infested. One and four-tenths were infested with the dwarf tapeworm; the remainder harbored the hookworm. The heavier infestations were in the districts of poorer, sandy land. An appreciable number of the children were heavily infested. Upton emphasizes the importance of the hookworm problem in the South at the present time.

MCBRYDE, Durham, N. C.

IMMUNITY TO VIRUS DISEASES. E. W. GOODPASTURE, Am. J. Pub. Health **26**:1163 (Dec.) 1936.

Goodpasture enumerates some of the facts concerning immunity to virus infections and discusses some of the theoretical mechanisms in such immunity. "The theory of cytotropism of viruses which hypothesizes that these active agents require a living intracellular environment for multiplication fits best the known facts concerning the reaction between the host and the virus during infection; and it offers constructive suggestions for analyzing conditions of resistance which often supervene." This theory best explains how virus disease may develop though specific antibodies are circulating in the serum. It is possible that continued immunity to virus disease is a result of the presence of living virus in cells of the animal. Protection against virus infections apparently does not result from administration of inactive virus-containing material.

MCBRYDE, Durham, N. C.

TULAREMIC MENINGITIS: REPORT OF A CASE, WITH POSTMORTEN OBSERVATIONS. E. R. PUND and M. B. HATCHER, Ann. Int. Med. **10**:1390 (March) 1937.

The case report is that of a Negress aged 12 years who died of tularemia. Necropsy revealed tularemic meningitis, which the authors attributed to hematogenous encephalitis. Lesions were observed in the uterus, thymus and appendix. Heretofore, such lesions have not been reported.

READING, Galveston, Texas.

STUDIES ON TETANUS TOXOID: I. ACTIVE IMMUNIZATION OF ALLERGIC INDIVIDUALS WITH TETANUS TOXOID, ALUM PRECIPITATED, REFINED. H. GOLD, J. Allergy **8**:230 (March) 1937.

The results of actively immunizing a group of thirty-one allergic patients with refined alum-precipitated tetanus toxoid are reported. The degree of immunization was determined by measuring the amount of antitoxin in the blood serum. The serum should contain at least from 0.1 to 0.25 unit of antitoxin per cubic centimeter.

These are minimal values and were determined by measuring the amount of antitoxin in the serum after passive immunization of a group of persons with 1,500 units of tetanus antitoxin.

Two lots of toxoid were used: one prepared from a toxin containing 6,000 times the minimum lethal dose per cubic centimeter and the other containing 20,000 times the minimum lethal dose per cubic centimeter. The method of using the toxoid varied so that the time required for immunity to develop and the duration of the immunity could be determined.

Two injections of 0.5 and 1 cc., respectively, of toxoid will produce active immunity which lasts from one to several months. A third or fourth dose then will increase the titer again, and this will last several months. The response seems to vary with the individual, and this fact may continue to give a feeling of false security until a test other than the titration method can be developed for determining the state of immunity.

Passive immunization is necessary in case of injury during the time required for development of immunity, which is several months.

HOYER, Cincinnati.

EPIDEMIC PLEURODYNIA IN CHARITON COUNTY (MO.). G. W. HAWKINS and F. L. HARMS, J. Missouri M. A. **34**:121 (April) 1937.

From Aug. 20 to Oct. 13, 1936, the authors encountered approximately one hundred cases of epidemic pleurodynia in Chariton County, Mo. The disease appeared suddenly in several localities, remained at its height for about three weeks and then subsided. The range in age was from 2 to 55 years, the majority of the victims being from 6 to 15 years old. Males and females were affected equally.

Pain was the only constant symptom encountered. This usually appeared suddenly and was lancinating. Its most frequent location was in the chest (more often in the left side). Other locations were the region of the ensiform cartilage, the costal margin of the ribs, the entire abdominal region, the back and the muscles of the back of the neck. Practically always there was deep pain on respiration.

The characteristic picture was that of a patient lying or sitting quietly in bed, his breathing rapid but shallow, with his eyes full of tears because of the extreme pain. Even children, who cry readily when in pain, seemed to realize that this only aggravated their symptoms and preferred to remain quiet.

The temperature ranged from 99 to 104 F. In a few cases the temperature was subnormal at the outset, preceding the period of fever.

The average duration of pain was from one half to four hours, the duration being largely affected by medication. The attacks occurred as often as two or three times in twenty-four hours, although in a few cases there was no recurrence after the initial attack. The authors state that from their experience a recurrence every twenty-four to forty-eight hours, covering a period of from four to ten days, was the most constant picture. The physical examination revealed no abnormality except some muscular rigidity.

This disease was reported in Iceland from 1856 to 1863, in Norway from 1872 to 1874 and first in America by Dabney in 1888. Colorado and California are the only states west of the Mississippi River from which the condition has previously been reported. The etiology and mode of transmission are unknown. Insects, particularly the mosquito, have been suspected of spreading the disease.

Whole blood has been injected from a patient ill with the disease for four days into a volunteer, but the results were negative. The prognosis of this disease is universally good. No fatalities have been recorded. The treatment is entirely symptomatic.

BERGER, Kansas City, Mo.

EPIDEMIC CATARRHAL JAUNDICE IN SCHOOL CHILDREN. ARTHUR A. LISNEY, Brit. M. J. **1**:703 (April 3) 1937.

An outbreak of jaundice is reported during which forty school children suffered from the disease; it is estimated that this number represents from 60 to 70 per cent of the total number of cases. Preschool children and young adults were also affected.

A brief account of the history of this epidemic is given. No etiologic factor was determined, after careful investigation. There is some evidence that contagion played a part. The onset was gradual as a rule. Headache, perhaps with nausea, loss of appetite and a feeling of lassitude and sleepiness, were among the premonitory symptoms. The breath was fetid, and the tongue was slightly furred. Bradycardia was the rule. The temperature was normal, but the face was flushed. Diarrhea was present in some cases, but constipation was usual. Some patients vomited only once, and others, several times for an hour or more. Pain in the upper part of the abdomen was not uncommon. Jaundice appeared from one to fourteen days after the acute symptoms, and the child immediately began to feel better.

The laboratory findings were not significant. The attempt to make a differential diagnosis between this and other conditions in which jaundice is an outstanding symptom is not conclusive. There is no specific treatment.

ROYSTER, University, Va.

FURTHER OBSERVATIONS ON THE TREATMENT OF TETANUS. B. B. YODH, Brit. M. J. **1**:855 (April 24) 1937.

A previous study on the antitoxin treatment of tetanus was reported in 1932 (*Brit. M. J.* **2**:589, 1932). In the present report the author's summary and conclusions are as follows:

1. A further series of 438 cases of tetanus has been observed, with special reference to the use of antitoxin.

2. The combined method of administration of the antitoxin—intrathecally through the cisterna magna, intravenously and intramuscularly—has been used in this as in the previous series.

3. The total mortality in all consecutive cases, except the 15 in which the patients were discharged by request, was 50.6 per cent and after the cases in which the patients died within twenty-four hours of admission were excluded it was 29.4 per cent. This compares somewhat unfavorably with the previous figures but probably may be explained by the fact that several brands of serum had to be used in the present group, while only one brand was employed in the previous series.

4. The use of paraldehyde per rectum is recommended as a routine as the most suitable sedative for hospital patients.

5. The clinical fact that the intrathecal administration of serum through the cisterna magna along with that by other routes controls better the course of the disease establishes the need for further study of the concentration of antitoxin in the blood serum after intrathecal injection.

ROYSTER, University, Va.

METROPOLITAN AND RURAL INCIDENCE AND DISTRIBUTION OF ACUTE RHEUMATISM AND RHEUMATIC HEART DISEASE IN NEW SOUTH WALES. K. MADDOX, M. J. Australia **1**:394 (March 13); 425 (March 20); 464 (March 27); 499 (April 3) 1937.

Part 1 is a survey of the data regarding patients admitted to various hospitals throughout New South Wales and postmortem evidence of rheumatic heart disease in the same patients. The author concludes that in regard to the incidence of rheumatism and heart disease New South Wales occupies a position between that of the northern part of the United States and that of Great Britain. There was an incidence of from 0.31 to 0.34 per cent of suspected disease in the school children and aboriginal children. The metropolitan schools had a lower incidence than rural schools.

Part 2 is a summary of school examinations throughout New South Wales made in an attempt to correlate the incidence of rheumatism and rheumatic heart disease with climatic variations. It was found that the conditions are rather evenly distributed over New South Wales, with a somewhat higher incidence of heart disease in the table-lands and slopes than in the coastal regions. In the coastal

mountain ranges and the areas close to its inland slopes there is also a higher incidence of organic cardiac rehumatism. Certain coastal areas characterized by salt water lagoons show a high incidence, and in some of the dusty areas with a small rainfall the incidence is low. Urbanization does not appear to raise the incidence. No increased incidence was found in irrigated and naturally damp areas.

Part 3 is a summary of the incidence of rheumatism and heart disease in Sydney. No definite relation to known areas of dampness, either ground dampness or poor drainage, could be established. By far the greater majority of patients came from the poorer, industrial quarters of the city and few from the better sections in the suburbs. Other possible factors, such as increased fatigue and poor nutrition among the poorer class, are briefly discussed.

The fourth article is a review of the clinical factors of rheumatism and heart disease, which shows some difference from similar surveys for other parts of the world. Premonitory symptoms, such as growing pains, were extremely rare. There seemed to be less family contact than has been indicated in other surveys. The age incidence (average 9 years) was about the same. No seasonal incidence could be determined. Rheumatic nodules were rare. Tonsillitis appeared to be commonly associated. Approximately half the children in their first attack escaped immediate cardiac damage, while only about 10 per cent escaped in repeated attacks. In no instance was the aortic valve the only one to be involved.

TENNEY, Madison, Wis.

THE SIGNS AND SYMPTOMS OF TAENIA SAGINATA INFESTATION. H. B. PENFOLD, M. J. Australia **1**:531 (April 10) 1937.

In a study of 100 patients infested with Taenia saginata, who were brought under observation by reason of an advertised offer of 5 pounds for a complete tapeworm, Penfold found the symptoms of the majority to be mild or absent. Definite signs and symptoms were present only when a fully grown worm or a large number of worms were harbored. In such cases the most frequent symptoms were giddiness, chiefly when the patient was hungry, and digestive disturbances, which in a few instances simulated duodenal or gastric ulcer, cholelithiasis or appendicitis. The most frequent and valuable sign was the finding of segments in the stools and on the underclothing. Examination of the blood of 16 of 20 patients disclosed relative lymphocytosis. Definite eosinophilia was observed in only 1 of 20 patients examined.

GONCE, Madison, Wis.

EPIDEMIC PLEURODYNIA. K. M. DOIG, M. J. Australia **1**:586 (April 17) 1937.

Doig reports a disease of epidemic nature which occurred in Colac, Victoria, in December 1936 and which in its symptomatology and course appeared to be identical with that described in the United States as epidemic pleurodynia. Children were the first to be attacked. Later the epidemic spread to young adults. The disease was characterized by sudden onset with severe pain, thoracic in children but thoracic or abdominothoracic in adults, fever, a rapid respiratory rate, absence of physical signs of pulmonary or pleural involvement, a short course (not more than four days) and complete recovery, without complications or prostration.

GONCE, Madison, Wis.

ACTION OF ANTISTAPHYLOCOCCUS SERUM IN EXPERIMENTAL STAPHYLOCOCCIC INFECTION IN THE RABBIT. D. COMBIESCO, G. ISTRATI, A. POP, N. COMBIESCO and M. ILIESCO, Compt. rend. Soc. de biol. **121**:177, 1936.

In rabbits, two antistaphylococcus serums, the one containing 40 and the other 135 international units, were given intravenously before and after intravenous introduction of staphylococci. Those treated with the stronger serum lived up to four and a half months. Those inoculated by the production of passive immunity, more especially those treated with the serum containing 135 units, had a greater percentage of survivals, even complete in many instances.

WAHL, Cleveland.

INTRADERMAL REACTION TO STAPHYLOCOCCUS TOXIN IN MAN. A. BROCAGE and P. MERCIER, Compt. rend. Soc. de biol. **121**:937, 1936.

Hemolytic staphylococcus toxin, diluted 1:100, heated and unheated, was injected into human subjects as in the Schick test. Within twelve hours the unheated toxin produced erythema, which remained for three or four days and even showed some papular characteristics, then slowly disappeared by desquamation in two weeks. From 90 to 95 per cent of the subjects showed positive reactions, and in children the percentage increased with age.

WAHL, Cleveland.

NATURAL ANTISTAPHYLOCOCCIC IMMUNITY IN INFANTS AND CHILDREN. C. BENTIVOGLIO and S. MOSCHINI, Lattante **8**:107 (March) 1937.

Of the three accepted methods of assaying the antitoxic potency of serum to staphylococci—the hemolytic, the intradermal and the flocculation—the first was used. The serum under examination is compared with a standard serum in its ability to prevent the hemolyzing of rabbit blood by diluted staphylococcus toxin.

The serum of the new-born has an antitoxic titer equal to that of the mother. This titer falls and reaches a minimum when the infant is from 2 to 3 months old; it then increases and in the 7 year old child approximates that of the adult. During or after staphylococcic infection the antitoxic titer of the young patient's blood is increased.

HIGGINS, Boston.

THREE CASES OF INFECTIOUS LYMPHOMONOCYTIC ADENOPATHY (INFECTIOUS MONONUCLEOSIS). F. CANTARUTTI, Lattante **8**:130 (March) 1937.

Three cases of infectious mononucleosis in children 15 months, 4 years and 10 years of age, respectively, are reported. In each case the onset was sudden and the cure complete. The percentages of monocytes in the blood smear on the fourth or fifth day of acute illness were 55, 28 and 32, respectively. Subsequent counts shortly after the patients had recovered gave 8, 8 and 9 per cent, respectively.

HIGGINS, Boston.

TEN YEARS OF ANTITETANIC TREATMENT IN THE PEDIATRIC DIVISION OF THE OSPEDALE CIVILE DI UDINE. A. VERITTI, Lattante **8**:139 (March) 1937.

Twelve of the twenty-two children treated for tetanus in a ten year period died, all but one of the deaths occurring within two days after admission to the hospital. All the patients were given serum therapy, usually intrathecally.

HIGGINS, Boston.

Chronic Infectious Diseases

FURTHER STUDIES ON PURIFIED PROTEIN DERIVATIVE OF TUBERCULIN (P.P.D.). E. R. LONG and F. B. SEIBERT, Am. Rev. Tuberc. **35**:281 (March) 1937.

The following conclusions were drawn from an analysis of about 95,000 completed tests with purified protein derivative:

Practically all patients with clinical tuberculosis react to the smaller standard dose. The exceptions are, for the most part, patients with acute tuberculosis or seriously ill patients with chronic tuberculosis. It seems probable that some of the reactions to the second, or larger, dose, in cases in which the reaction to the first dose is negative, are nonspecific. This is also true of other forms of tuberculin.

An investigation is in progress looking to the selection of an intermediate dose for the detection of significant reactors without causing serious reactions. The safe dose seems to vary with the degree of tuberculization of the population and in different social groups. In communities where less than 40 per cent react to

the two doses, a dose one-tenth as large as the standard second dose appears practical for case-finding purposes.

Dilutions of purified protein derivative may be kept for three days in the icebox without loss of strength.

EUGENE SMITH, Ogden, Utah.

THE TREATMENT OF THE CHILD WITH THE ADULT TYPE OF ACTIVE PULMONARY TUBERCULOSIS. M. GROSS and S. B. ENGLISH, Am. Rev. Tuberc. **35**:303 (March) 1937.

Adult tuberculosis in juveniles is insidious in its onset, and the silent form is surprisingly common. In many cases, by the time signs and symptoms are present the disease is in a practically hopeless condition for therapeutic approach. Once the adult destructive type of the disease starts, it progresses to a fatal termination unless some active form of therapeutic collapse is instituted. Ordinary treatment in a sanatorium, with rest and general care, is inadequate except in cases in which the disease is minimal in severity. In those cases in which observation shows progress of the disease, collapse therapy should be instituted immediately.

EUGENE SMITH, Ogden, Utah.

SODIUM BISMUTHATE SOLUBLE IN EXPERIMENTAL SYPHILIS. P. J. HANZLIK, J. Pharmacol. & Exper. Therap. **59**:328 (March) 1937.

This preparation was very successful in clearing the lesions due to Spirochaeta pallida and healing the lesions in infected rabbits. The rate of healing was fairly proportional to the dose, i. e., double or triple the dose reduced the time to one-half or one-third; this is not true of insoluble compounds of bismuth. The effective dose is far below the toxic dose. As clinical trials are to be reported later, details need not be given.

PILCHER, Cleveland.

CHILDHOOD TUBERCULOSIS. J. H. MURPHY, Nebraska M. J. **22**:86 (March) 1937.

Early recognition and prevention of spread are the two important phases of the tuberculosis problem. Primary infection usually takes place in infancy and childhood. This represents the logical point of attack on the problem. The primary infection tends to disappear without destruction of tissue. Calcification or fibrosis may occur, but not cavitation. The child, however, has become sensitized to the tubercle bacillus. Reinfection of endogenous or exogenous origin produces ulceration and destruction. Periodic examinations show the pathologic changes due to reinfection before it produces fever, cough, debility and hemorrhage. The incidence of tuberculosis in a family, group or locality is dependent on contacts. In Nebraska the occurrence of bovine tuberculosis has been steadily reduced as the result of a campaign for testing cattle for tuberculosis. The findings are the first requisite in the study of a case. The Mantoux reaction is positive in 97 per cent of infected persons. This test, with the history and the physical and roentgenographic findings, furnishes the evidence. Symptoms diagnostic of tuberculosis are not present in children. Of the author's cases there were none in which tuberculous infection was demonstrable in the tonsils. In the presence of acute symptoms during the primary infection, the patient should stay in bed. Fatigue is to be avoided. Adequate diet, including sufficient vitamin and mineral supplies, is important. Avoidance of contact with tuberculous patients is essential. Prevention of intercurrent nontuberculous infections is desirable. Treatment for reinfection is much more vigorous. This presupposes rest in bed for a long period, collapse of the lung in suitable cases and possibly surgical intervention, except in the group last mentioned. It is best to maintain as near as possible the child's normal life.

HAMILTON, Omaha.

THE NATURE AND IMPORTANCE OF PRIMARY INFECTION IN TUBERCULOSIS. E. W. HANCOCK, Nebraska M. J. **22**:98 (March) 1937.

Primary tuberculosis may be defined as the pathologic changes which occur at the points of localization of the first infecting dose of tubercle bacilli and the

systemic results of these changes. Superinfection must be sharply differentiated from the primary infection, the difference being not in the infecting organisms but in the host. In primary infection there are or may be no cutaneous symptoms, but pathologic changes are produced in the lungs and lymphatics. This preallergic period lasts from three to eight weeks, and its end is marked by a rise in temperature and the appearance of skin sensitivity. The end of this acute stage is marked by a permanent fall in temperature and a return of the sedimentation rate to normal. The author considers the latter as important. This primary lesion may spread either by continuity or by hematogenous or lymphogenous dissemination. If no superinfection occurs, these foci may completely disappear, and even the tuberculin reaction may become negative. The allergic reaction produced is the most important factor. In the primary infection the diagnosis rests on the history of contacts, physical findings, roentgen examination and observation. The treatment of primary tuberculosis may be summed up in two words: "Prevent reinfection."

HAMILTON, Omaha.

CONGENITAL SYPHILIS IN ONE OF IDENTICAL TWINS. OSWALD J. MCKENDREE, New York State J. Med. **37**:659 (April 1) 1937.

A mentally defective Italian girl of 13 years was found to have juvenile dementia paralytica. The Wassermann reaction of the blood and spinal fluid was positive. The twin sister showed negative results of the Wassermann, colloidal gold and mastic tests.

AIKMAN, Rochester, N. Y.

SYPHILIS IN INFANCY AND CHILDHOOD. G. M. LYON, West Virginia M. J. **33**:62 (Feb.) 1937.

This article is so meaty that it does not lend itself well to brief abstraction, and the entire paper should be read.

Acquired syphilis in infancy is rare and differs little from that in later life.

Syphilis cannot be directly inherited. The fetus is infected in utero.

Germinal transmission from the father is a physical impossibility as the body of the spirochete is from 6 to 15 microns in length, while the head of the spermatozoon is only from 3 to 6 microns in length. Syphilis in the infant therefore means syphilis in the mother.

A mother cannot be infected by her syphilitic infant because she is already infected.

Syphilis in the infant may be latent, therefore symptomless.

If either parent is syphilitic the baby will be syphilitic, unless the mother receives early and adequate treatment. Infection occurs between the fourth and fifth months.

Transmission to the third generation does not occur.

Symptoms do not always appear early—during the first month in about 50 per cent of cases and in the second month in about 83 per cent. Snuffles are an early symptom, appearing in from two to six weeks.

The temporary teeth show no characteristic changes, but decay early. The Hutchinson deformity occurs in the permanent teeth.

The liver and spleen are involved early and show enlargement.

Diagnosis is easy in the well marked case: snuffles, rash, aural and anal fissures, rhagades, mucous patches, enlarged liver and spleen and positive serologic tests.

Treatment is discussed at length. It should be begun in intrauterine life. Arsphenamine is the most effective agent, used intravenously and intramuscularly. Bismuth and acetarsone (stovarsol) are used.

SHAWKEY, Charleston, W. Va.

A NOTE ON THE EXAMINATION OF TUBERCULOSIS HOME CONTACTS. G. GREGORY KAYNE, Brit. M. J. **1**:858 (April 24) 1937.

This article is a brief account of an investigation made on possible contacts of children showing evidence of tuberculosis.

ROYSTER, University, Pa.

INCIDENCE OF SYPHILIS AMONG SCHOOL CHILDREN OF KINGSTON, JAMAICA. DAHLIA WHITBOURNE and GEORGE M. SAUNDERS, Brit. M. J. **1**:1108 (May 29) 1937.

This represents the results of serologic studies on school children in Jamaica. There is a brief discussion of the interrelationship between syphilis and yaws. The summary and conclusions are as follows:

1. From seventeen schools 1,103 school children, representing the lower middle and lower classes of society, were examined clinically and serologically to determine the incidence of syphilis.

2. There were 43 children, or 3.9 per cent, who gave positive serologic reactions. Among these were 13 whose positive reactions were almost surely due to yaws, leaving 30, or 2.7 per cent, with probable congenital syphilis.

3. It is estimated that congenital syphilis is present in about 3 per cent of all black and colored children of Kingston.

4. Syphilis doubtless reaches a much higher incidence among the entire population. The exact figure cannot be stated, but, on the basis of evidence gathered elsewhere concerning the ratio of the incidence of syphilis in children to that for the entire population, it may be said to be approximately 12 per cent.

ROYSTER, University, Va.

THE BACTERIOLOGY OF TUBERCULOUS ABDOMINAL ADENITIS. J. SMITH, Edinburgh M. J. **44**:165 (March) 1937.

Smith classifies tuberculous abdominal adenitis as disease of the abdominal nodes alone and that secondary to active tuberculosis in other regions. Tuberculosis of the abdominal nodes alone occurs chiefly in childhood, owing to the child's ready accessibility to many tubercle bacilli through ingestion. The disease may begin after the age of 3 months, and the incidence then increases progressively to the period of maximum frequency, at the age of 2 or 3 years. After this age there is a definite decline in frequency. The primary site of tuberculous infection is somewhat more common in the thorax than in the structures of the abdomen.

Secondary abdominal adenitis is of frequent occurrence, owing to the swallowing of large amounts of sputum in cases of chronic ulcerative involvement of the lungs, so that the usual mode of infection of the intestine is probably by way of the lumen.

A relatively high incidence of bovine bacilli has been found in Scotland in cases of nonpulmonary tuberculosis. There is no doubt that the principal source of bovine bacilli in human disease is infected milk. In the strictly rural districts which were studied there is a possibility that infection occurred through infected dust. In cases of intestinal tuberculosis the bovine infection began a long time before clinical symptoms appeared. The author discusses the high incidence of bovine tuberculosis in relationship to the large consumption of milk in the counties which were surveyed. He thinks that the amount of milk consumed and the incidence of bovine infection in human beings are closely related.

NEFF, Kansas City, Mo.

RADIOLOGICAL ASPECTS OF TUBERCULOUS ADENITIS OF THE ABDOMEN. D. P. LEVACK, Edinburgh M. J. **44**:172 (March) 1937.

Levack, who is honorary roentgenologist to the Royal Infirmary, Aberdeen, Scotland, has collected 725 cases of various abdominal conditions in which roentgen pictures were made. In 6 of 53 cases a simple roentgenogram showed nodes which were suspected of being tuberculous, and in 7, calcified nodes which had not been suspected; 12 films failed to show suspected nodes. The urinary tract furnished cause for roentgenographic examination in the largest number of cases, and in a considerable number calcified nodes were revealed which were not suspected necessarily of being tuberculous.

The number of instances of calcification of abdominal nodes is not excessively large. The author does not state whether any of these cases occurred in childhood.

NEFF, Kansas City, Mo.

SURGICAL ASPECTS OF TUBERCULOUS ADENITIS OF THE ABDOMEN. W. ANDERSON, Edinburgh M. J. **44**:176 (March) 1937.

Anderson, who is surgeon to the Royal Infirmary in Aberdeen, Scotland, made investigation in 164 consecutive cases in which the patient complained of abdominal discomfort. He found that tuberculous mesenteric glands are moderately frequent in this part of Scotland. In the early stage of involvement symptoms are poorly defined; after the glands become calcareous they usually cause no symptoms; if there are abdominal symptoms, however, pathologic lesions may be observed on operation, at which time the glands, if recently inflamed, should be removed. Whether the patients were adults or children is not mentioned in this article.

NEFF, Kansas City, Mo.

GENERAL PROGNOSTIC ASPECTS OF TUBERCULOUS ADENITIS OF THE ABDOMEN. W. BROWN, Edinburgh M. J. **44**:180 (March) 1937.

The author is physician at the Royal Hospital for Sick Children, Aberdeen, Scotland. He limits the discussion to the disease as it occurs in childhood. Generally the prognosis is favorable, as proved by the relatively few deaths in so common a disease as abdominal tuberculous adenitis. In cases of children who do not die of tuberculosis, autopsy may show evidence of tuberculous glands, which are usually caseous. In case of living persons, roentgen examination as a routine often gives evidence of calcareous glands; many such patients might also have caseating glands. During abdominal operations tuberculous glands may be observed which are not the cause of the illness necessitating operation.

In the first ten years of life there is less susceptibility to abdominal than to pulmonary tuberculosis, because the bovine type of infection develops more gradually, giving more time for building up resistance. However, if circumstances arise for fresh infection of the glands, no resistance may be developed. Any acute disease in a child already infected with tuberculosis adds danger to life and may reactivate the tuberculous foci, causing the disease to become diffuse.

The disease may end in healing and complete absorption, for there is great metabolic activity in childhood. Recovery is never a rapid process. Streptococcic adenitis may confuse the picture of tuberculous adenitis. The diagnosis of tuberculosis should be verified by the history, the roentgenographic findings, tests with both human and bovine tuberculin, rectal temperatures taken every four hours with the child resting, the presence of palpable glands and general symptoms, consisting of loss of weight and appetite and the occurrence of alternating constipation and diarrhea. The management should take every opportunity to improve the child's condition rather than a complacent attitude toward the disease.

NEFF, Kansas City, Mo.

A TUBERCULIN SURVEY OF CHILDREN IN THE WEST OF SCOTLAND. J. W. S. BLACKLOCK, Edinburgh M. J. **44**:245 (April) 1937.

Blacklock is the pathologist at the Royal Hospital for Sick Children, Glasgow. He reports tests with old tuberculin, beginning with a dilution of 1:1,000 and repeating, if the test was negative, with stronger dilutions, 1:100 or 1:10.

Infants under 6 months of age do not give a positive reaction unless they have clinical tuberculosis. The percentage of positive reactors rises until at 12 years 67.5 per cent react. Children of the towns have a higher incidence of reaction to tuberculin than those of the country. The postmortem series proves that urban children under 3 years of age have a higher incidence of tuberculosis.

NEFF, Kansas City, Mo.

EPITUBERCULOSIS SHOWING ALSO BONE LESIONS. DONALD BATEMAN, Proc. Roy. Soc. Med. **30**:711 (April) 1937.

When 8 months old the patient suffered from an attack of bronchitis. At 11 months the child had a cough and rhonchi in the chest. About this time it was found that the child's father, living in the same house, had active tuberculosis. For this reason the child's chest was examined roentgenographically. An epituberculous lesion was observed spreading from the hilus of the right lung; there were also two calcified lesions in the left lung. The Mantoux reaction was positive (1:1,000). Further roentgenograms showed lesions in the upper end of the left humerus and the upper end of the left femur, involving also the epiphyses of both bones. There was no fever. Pulmonary tissue withdrawn by needle from the right side of the chest showed no tubercle bacilli, and a guinea-pig inoculated with tissue did not acquire tuberculosis. Some calcified glands appeared in the neck and both axillae. The child was discharged in good condition in about a month. Two months later the child was readmitted with bronchopneumonia. The temperature fell to normal in forty-eight hours, and recovery followed.

Reinvestigations made at that time are reported, with roentgenograms of the chest and bones.

WILLIAMSON, New Orleans.

PULMONARY TUBERCULOSIS DURING PUBERTY. P. NOBÉCOURT and S. B. BRISKAS, Arch. de méd. d. enf. **40**:137 (March) 1937.

The important periods of prepuberty and of puberty may be described as phases of transformation during which an exceptionally heavy demand is made of the organism. If the subject is in good health and lives under suitable hygienic conditions, this extra load is carried without damage; if there are defects, congenital or acquired, or if the environment is unwholesome, the resistance of the body is correspondingly reduced. There is increased sensibility to pathogenic agents and particularly to pathogenic bacteria, among which the tubercle bacillus must be primarily considered.

Nobécourt and Briskas review their experience in the medical clinic for children from Jan. 1, 1921, to Dec. 31, 1934. Positive cutaneous tests were noted in 46 per cent of 100 children of both sexes between the ages of 6 and 7 years and in 65 per cent of those between 10 and 15 years. Among 100 boys between 6 and 10 years, 43 per cent had positive reactions, and in a group of 100 girls, 49 per cent. Active tuberculosis was found in from 9 to 18 per cent, and, with respect to actual pulmonary involvement, the incidence varied from 1.8 to 8.1 per cent among the different groups. The proportion was much higher in the class from 10 to 15 years of age than in that from 6 to 10 years of age, and the girls of the former category showed a much higher rate of pulmonary infection than the boys.

Numerous tables are included in the text to demonstrate the frequency of tuberculous infection in various age periods and the relative frequency of the pulmonary type. Further analyses are made of cases in which the caseo-ulcerous form of pulmonary tuberculosis was present, and a review of the rapid evolution in these patients is given. The nodular disseminated type and the splenopneumonic variety are discussed at length, and the mortality rates for all the groups are included.

AMESSE, Denver.

SHORTENING OF THE ULNA IN CASES OF SPASTIC PARALYSIS WITH SYPHILIS. F. NÜHSE, Monatschr. f. Kinderh. **69**:343 (March) 1937.

Nühse reports on thirteen children with congenital syphilis, ten of whom had a shortened ulna. He further reports four cases of spastic paralysis in which shortening of the ulna existed. In these children with spastic paralysis syphilis was suspected. Shortening of the ulna is usually ascribed to cerebral injury. Nühse thinks it may be the result of the syphilis.

GERSTLEY, Chicago.

CLINICAL AND EPIDEMIOLOGIC IMPORTANCE OF TUBERCLE BACILLI IN THE GASTRIC CONTENT OF CHILDREN. F. DUSCH, Ztschr. f. Kinderh. **58**:479, 1936.

Dusch presents a dissertation on the literature and his experience with the demonstration of tubercle bacilli in the gastric contents of children.

Opinions regarding the technic vary. He states that 300 cc. of fluid should be treated and used. The use of one tenth of this amount gives a positive result less frequently. While inoculation of guinea-pigs gives the greatest number of positive results, cultures are less expensive. The use of both methods is desirable. A demonstration of bacilli by smear makes both methods unnecessary.

In many cases of tuberculosis, as epituberculosis, primary infiltration and hilar involvement, formerly regarded as closed results are positive. In practically all cases the presence of a parenchymatous pulmonary lesion may be assumed. The presence of bacilli in the gastric content apparently does not necessarily denote a bad prognosis, and isolation of bacilli does not always indicate isolation of the patient. In patients presenting a cough or a destructive involvement of a lung isolation as carried out for other patients with open lesions is indicated.

SIEMSEN, Chicago.

ANTITUBERCULOUS VACCINATION WITH BCG. J. STEIN, Zycie Dziecka **6**:12 (Jan.) 1937.

Stein presents a résumé of the radio talk given by Kamil Guérin at the Warsaw Institute. Dr. Guérin was a pupil of Calmette and, together with Calmette, did a great deal of work along the line of vaccination against tuberculous infection.

Discussing the value of immunization against tubercle bacilli, he comes to the conclusion that BCG vaccination holds great promise for the future.

In communities where children live with tuberculous persons, vaccination of this type cuts down the mortality and morbidity fourfold.

KRUPINSKI, Chicago.

TUBERCULOUS MENINGITIS ONCE AGAIN. A. GUNTHER, Acta pædiat. **19**:420, 1937.

Gunther continues his controversy with Wallgren concerning the correct evaluation of the causes which are responsible for the recent decline in mortality from tuberculosis which has occurred in Sweden. The details of the argument have been aired in previous issues of the *Acta Pacdiatrica* and have been published in abstract in the AMERICAN JOURNAL OF DISEASES OF CHILDREN.

In the present chapter Gunther modifies slightly his method of attack, bringing his criticism to bear specifically on Wallgren's alleged overestimation of the rôle of BCG in producing the improvement. He cites the fact that equally good results have been obtained in Minnesota, U. S. A., without the use of BCG.

MCCUNE, New York.

REPLY TO THE PRECEDING. A. WALLGREN, Acta pædiat. **19**:423, 1937.

Wallgren regards Gunther's citation of the experience in Minnesota as confirmation of the correctness of his own assertion that public health measures are important in controlling tuberculosis. However, similar methods were not equally affective in Göteborg: comparable success was not attained until BCG vaccination was introduced.

MCCUNE, New York.

PRIMARY TUBERCULOSIS OF THE PERITONEUM IN AN INFANT. T. SALMI, Acta pædiat. **19**:432, 1937.

Tuberculous peritonitis occurs most commonly in children between 2 and 10 years of age and is extremely uncommon in infants during the first year of life. Engel has laid down two postulates for the diagnosis of primary tuberculosis of

the peritoneum: (1) that a primary complex be demonstrated in some part of the alimentary tract and (2) that no evidence of tuberculosis be found in other systems of the body, particularly in the lungs and bronchial lymph nodes. Although the alimentary tract formerly was commonly a portal of entry for the tubercle bacillus, only a small number of cases which fulfil these postulates can be found reported in the more recent literature.

Salmi reports on the case of a 9½ month old boy who had been reared under extraordinarily bad hygienic circumstances. At the age of 6 months he became sick, with vomiting, diarrhea, fever and loss of weight; the abdomen became tremendously distended. The stools contained no blood. The Mantoux test was positive. A correct diagnosis was not made during life. Autopsy revealed the presence of fibrinous tuberculosis of the peritoneum without ascites. A primary complex was not demonstrated in the alimentary tract. However, Engel's second postulate was satisfied so far as no evidence of tuberculosis could be detected elsewhere in the body.

McCUNE, New York.

STUDIES ON THE VALUE OF THE TUBERCULIN TITER IN TUBERCULOSIS IN CHILDREN. T. K. WITH, Hospitalstid. **80**:253, 1937.

The author studied the results of graduated intracutaneous tuberculin tests of one hundred sixteen children. The sensitivity was highest in primary tuberculosis, lower in healed primary tuberculosis and lowest in meningitis and miliary tuberculosis. He considers the graduated test of great diagnostic value in childhood.

ELGHAMMER, Chicago.

FUSION OF THE REMNANTS OF DISEASED VERTEBRAE IN TUBERCULOUS SPONDYLITIS. R. J. HARRENSTEIN and G. J. HUËT, Nederl. tijdschr. v. geneesk. **81**:1002 (March 6) 1937.

The question whether tuberculous spondylitis can be considered as healed is judged by means of the roentgenographic signs of fusion of the remnants of the diseased vertebrae. Sometimes, however, the roentgenogram is unreliable; the causes of this difficulty are considered. Attention is paid to the changes in the posterior portions of the vertebrae in tuberculous spondylitis, previously described, caused by abnormal pressure and traction, often producing bony fusion of the vertebrae in the region of the vertebral arcs and of the articular processes. A more detailed roentgenologic study of these changes, which until now have been neglected at examination, is judged desirable.

VAN CREVELD, Amsterdam, Netherlands.

A CASE OF SYPHILIS CONGENITA IN THE "SECOND" GENERATION. C. GOEDHART. Nederl. tijdschr. v. geneesk. **81**:1436 (April 3) 1937.

Goedhart reports a case of proved syphilis congenita in the second generation of a grandfather who is now 42 years of age and who acquired syphilis at the age of 20. He was treated during the first year of the disease but not afterward. He now has symptoms which indicate with certainty an infection of the central nervous system: Argyll Robertson and unequal pupils. He has no other neurologic symptoms. The reactions of the blood for syphilis are all strongly positive. The Wassermann reaction test of the spinal fluid is positive; the Müller, Nonne and Pandy reactions are all positive; the lymphocytes number 4. His wife, who is now 40 years of age and has never been treated for syphilis, has a strong positive reaction of the blood and no clinical symptoms at all (syphilis latens). She first gave birth to a 7 month baby and then to an 8 month baby, who lived for one and two weeks, respectively, and subsequently to a daughter, who is now 21 and who is suffering from congenital syphilis with dementia paralytica of the tabetic form. This daughter also never has been treated for syphilis; she married a healthy man with negative blood reactions. After a miscarriage after three months, she gave birth to a child with proved symptoms of syphilis congenita.

VAN CREVELD, Amsterdam, Netherlands.

A Case of Osteitis Tuberculosa with Distinct Enlargement of the Bone Nuclei and Atypical Localization. C. W. Prins, Nederl. tijdschr. v. geneesk. **31**:1736 (April 17) 1937.

A case of osteitis tuberculosa is described in a boy of 1 year. Eighteen parts of the skeleton were affected. Attention is drawn to the enlargement of the epiphyses under the influence of the tuberculous process and to spina ventosa of the right tibia.

van Creveld, Amsterdam, Netherlands.

Diseases of Blood, Heart and Blood Vessels and Spleen

Purpura Haemorrhagica with Lymphocytosis: An Acute Type and an Intermittent Menstrual Type. G. R. Minot, Am. J. M. Sc. **192**:445 (Oct.) 1936.

A description is given of: (1) three nonfatal cases of acute purpura haemorrhagica (thrombopenic purpura), with a pronounced increase in the number of lymphocytes, many of which were abnormal; and (2) three cases of purpura haemorrhagica occurring periodically with menstruation which after from three to seven attacks ceased spontaneously. In association with one attack in two cases and two attacks in the third case a temporary increase in the lymphocyte count occurred associated with fever.

Henske, Omaha.

Hereditary Pseudo-Hemophilia. W. M. Fowler, Am. J. M. Sc. **193**:191 (Feb.) 1937.

A hereditary hemorrhagic diathesis presenting features distinctly different from those of true hemophilia is being recognized with increasing frequency. The blood and familial features in two cases are presented. The predominant feature was a prolonged bleeding time with a normal platelet count, normal coagulation and normal clot retractility.

Transfusions seemed to give the best results, although these results are stated to have been transitory at best.

Henske, Omaha.

Effect of Various Supplements to the Diet on the Iron Balance of the Anemic Infant. F. W. Schlutz, M. Morse and H. Oldham, J. Pediat. **10**:147 (Feb.) 1937.

The iron metabolism and hemoglobin of three infants suffering from secondary anemia were studied by adding spinach, apricots, liver and iron and copper salts to a diet of powdered milk, cane sugar and cod liver oil. Iron supplied by a purée of spinach was not utilized, and iron supplied by apricots, although utilized better than that of spinach, did not increase the hemoglobin and only slightly increased iron retention. Liver added to a diet of low iron content caused only a slight increase in iron retention and no gain in hemoglobin. Liver added to a diet high in iron content caused a decrease in iron retention.

The authors believe that this was probably due to a lessened need of the infant for iron at this time. Iron salts caused a marked increase in iron retention and a rise in hemoglobin. No evidence was found that the ferrous salt was more efficacious than the ferric salt. Copper salts when added to a diet either low or high in iron had no effect on iron retention or hemoglobin level, probably because the copper content of the diets was adequate.

Rauh, Cincinnati.

The Preparation of Ferrous Gluconate and Its Use in the Treatment of Hypochromic Anemia in Rats. P. Reznikoff and W. F. Goebel, J. Pharmacol. & Exper. Therap. **59**:182 (Feb.) 1937.

The authors aimed to find an iron preparation that could be given parenterally to man or animals without causing local or general reactions and would be efficient

therapeutically. Ferrous gluconate, of many compounds studied, fulfilled these conditions in young rats and caused no untoward symptoms or reactions in man. Anemia was induced in the offspring of milk-fed rats in two to three months by an exclusive milk diet. In these anemic animals reticulocytosis and hemoglobin were very effectively increased by ferrous gluconate administered by the oral or the parenteral route, the latter being about 50 per cent more effective than the former. "These results compare very favorably with those reported in the literature."

PILCHER, Cleveland.

HEMOPHILIA. R. C. ELEY, M. Clin. North America **21**:375 (March) 1937.

Hemophilia rarely manifests itself clinically before the first part of the second year of life, although hemorrhage may follow simple surgical procedures before this time. The tendency to bleeding varies with persons and in the same person at different times. Hemorrhages occur more frequently during the presence of infection than at other times. Bleeding almost invariably is a result of trauma, and the viscera, except the kidneys, are rarely affected. Bleeding into a joint is not uncommon and may lead to considerable disability. The prognosis in hemophilia becomes better as the patient increases in age and is able to avoid trauma more effectively. Although the coagulation time may not be markedly prolonged in all persons with hemophilia, the hazard so far as life is concerned is practically the same in all cases.

Many forms of treatment have been tried, no one of which has proved thoroughly satisfactory. Recent clinical experiments with an extract of human placental tissues have apparently shown that this substance will coagulate the plasma of hemophiliacs and will reduce the coagulation time of venous blood to within normal limits. However, this reduction persists only for from forty-eight to seventy-eight hours. Certain patients do not respond, and this is especially true of older children and adults. The extract should be given by intramuscular injection, with caution. Intravenous injection may prove fatal.

EUGENE SMITH, Ogden, Utah.

CONGENITAL HEMOLYTIC ANEMIA IN INFANCY AND CHILDHOOD. L. K. DIAMOND, M. Clin. North America **21**:401 (March) 1937.

The diagnosis of this condition can usually be made from the following symptoms: chronic or recurring anemia associated with mild icterus, which is accentuated during crises of hemolysis; enlargement of the spleen; increased urobilin in the urine and stools; increased fragility of the red cells, and increased percentage of reticulocytes. As in many other conditions, variations from the usual clinical picture are common.

In this paper, Diamond details the histories in cases illustrating especially the peculiarities of the disease as it occurs in childhood. Among the peculiar symptoms occurring in these cases were enlargement of the heart with loud murmurs resulting from the severe anemia; rapidly progressing anemia with cardiac decompensation due to anoxemia and anemia, requiring emergency treatment; severe abdominal pain accompanied by vomiting during the crisis, which closely simulated an acute surgical condition; retardation in the growth and development of bones, characterized by hypertrophy of the medullary substance, and great increase in the normal amount of urobilin in the urine and stools, going hand in hand with the severity of the hemolysis and anemia. It is evident from a study of these cases that congenital hemolytic anemia occurring in childhood may not progress in as benign a fashion as in adult life. The younger the patient at the time the first crisis occurs, the more severe the disturbance is likely to be, and death may occur even during the first attack. Early splenectomy for the infant or child is indicated, and sometimes it will be necessary as a life-saving measure.

EUGENE SMITH, Ogden, Utah.

COARCTATION OF THE AORTA: REPORT OF TWO UNUSUAL CASES. W. H. GOODSON JR., New England J. Med. **216**:339 (Feb. 25) 1937.

Roentgenograms from both cases are shown. In the first case, that of a boy aged 16 years, death occurred as the result of rupture of an aortic aneurysm into a small bronchus.

The second case, that of a girl aged 19 years, was discovered in the course of routine physical examination of basketball players. The major points of interest in connection with such an anomaly—the incidence, etiology, diagnosis, pathologic physiology, treatment and prognosis—are well presented.

The cases exemplify the major diagnostic criteria of the condition—brachial hypertension with femoral hypotension, visible collateral circulation, systolic thrill with diastolic shock at the base, absence of the aortic knob and faint erosion of the ribs as revealed by the x-ray.

The diagnosis in one case was confirmed by autopsy, in which the concomitant unexpected observation of a bicuspid aortic valve and an anomalous right coronary artery was made. The other case illustrates well the fact that the condition is not incompatible with apparently good health.

GENGENBACH, Denver.

BLOOD CYSTS IN HUMAN CARDIAC VALVES. D. R. DOW and W. F. HARPER, J. Anat. **71**:117, 1936.

Blood cysts were noted in the valves of five of seven hearts of infants (up to 6 months of age). The specimens showed small dark red nodules projecting on the atrial aspects of the cusps, a short distance from their edges. They varied from 0.2 to 1 mm. in diameter and presented no external opening. One of the specimens contained microscopic cysts. The cysts consisted of monolocular spaces filled with erythrocytes and a few polymorphonuclear leukocytes and were lined with a single layer of endothelial cells. The tricuspid valve was most frequently affected. No pathologic effects were noted. The origin is attributed to the pressing of blood in the cavity of the heart into the cusps from the ventricular aspect.

STENN, Chicago. [ARCH. PATH.]

FATE OF THORIUM DIOXIDE (THOROTRAST) IN CEREBRAL ARTERIOGRAPHY. D. W. C. NORTHFIELD and D. RUSSELL, Lancet **1**:377 (Feb. 13) 1937.

The use of thorium dioxide as a means of visualizing the cerebral circulation was introduced by Moniz in 1931 as a substitute for the use of sodium iodide. After three years' experience he emphasized the harmlessness of thorium dioxide.

Northfield and Russell describe here four cases in which there was histologic evidence of retention of thorium dioxide in the lumens or walls of cerebral vessels or in perivascular macrophages, after arteriography. The aggravation of clinical symptoms observed in two of the cases and the retardation of recovery from operation in one may have been due to the occlusion of vessels by thorium dioxide.

Retention appears to be liable to take place in the neighborhood of compressing lesions such as a meningioma, a large hemorrhage or a chronic abscess. The use of thorium dioxide is considered inadvisable unless exact diagnosis is unattainable without it.

LANGMANN, New York.

ATHLETICS AND THE HEART: AN ELECTROCARDIOGRAPHIC AND RADIOLOGICAL STUDY OF THE RESPONSE OF THE HEALTHY AND DISEASED HEART TO EXERCISE. E. L. COOPER, J. O'SULLIVAN and E. HUGHES, M. J. Australia **1**:569 (April 17) 1937.

The authors conclude: 1. During muscular exercise the heart does not dilate to any appreciable degree. 2. Immediately subsequent to exercise the heart is smaller than either before or during exertion. 3. If the heart enlarges during training, such enlargement is temporary and disappears when training ceases.

4. The size of the heart recorded on roentgen films with two seconds' exposures is a representation of the degree of diastolic filling of the chambers of the heart. 5. Variations in the size of the heart during athletic activity are more likely to be due to alterations in the degree of diastolic filling of the chambers of the heart than to thickening of the wall. 6. There is no evidence of permanent change in the heart following training for athletic sports. 7. Extreme physical effort in the trained athlete does not result in damage to the heart.

GONCE, Madison, Wis.

DISCUSSION ON PURPURIC CONDITIONS IN MAN AND ANIMALS. L. S. P. DAVIDSON, C. DAVENPORT and D. S. RABAGLIATI, Proc. Roy. Soc. Med. **30**:715 (April) 1937.

Davidson, in the first part of this paper, discusses fully the etiology and classification of the purpuras, the prognostic venom test of Peck and Rosenthal and the treatment of idiopathic thrombocytopenic purpura. He reports on three patients treated in his wards with roentgen exposure of the spleen, cevitamic acid given intravenously and moccasin snake venom given subcutaneously.

In conclusion the author states that the presence of platelets in normal or reduced numbers constitutes the best indication at present available for classification of the purpuras and that the reaction to intracutaneously injected snake venom is of value in the diagnosis and prognosis of the hemorrhagic tendency. A critical review is given of the literature dealing with the claims regarding the beneficial effects produced by irradiation of the spleen, the intravenous injection of vitamin C and the subcutaneous injection of moccasin snake venom. Additional evidence of a fully controlled nature is necessary before these claims can be admitted. Treatment of three patients with idiopathic thrombocytopenic purpura by these measures failed to produce the results claimed by their originators.

In the second part of this paper Major Davenport discusses purpuric conditions in the horse, cattle, the dog and the cat.

In the third section Major Rabagliati discusses purpura hemorrhagica in the ox.

WILLIAMSON, New Orleans.

EFFECT OF CEVITAMIC ACID ON THE PROLIFERATION OF MONOCYTES. L. E. BAKER, Compt. rend. Soc. de biol. **121**:427, 1936.

Previously it had been shown that monocytes are preserved and multiply for long periods in a medium of blood serum, sucrose, salt, Witte's peptone, blood chloride, cystine, thyroxine and vitamins A, B and D. The addition of vitamin C (preserved by the addition of glutathione) caused more rapid proliferation of the monocytes.

WAHL, Cleveland.

HEMIPLEGIA IN HEART DISEASE. L. ZILOTTI, Lattante **8**:136 (March) 1937.

The patient had congenital malformation of the heart, with some cyanosis, a red blood cell count of 7,800,000 and a hemoglobin value of 136 per cent. A diagnosis of pulmonary stenosis and patent interventricular septum was made. At the age of 3 years he had an episode of extreme cyanosis and complete right hemiplegia; right hemiparesis remained. The episode was probably due to a thrombus or an embolus.

HIGGINS, Boston.

INFECTIOUS HYPERPLASTIC RETICULO-ENDOTHELIOSIS IN THE EVOLUTION OF GRANULOXANTHOMATOSIS OF THE HAND-SCHÜLLER-CHRISTIAN TYPE. A. G. FLORI and G. PARENTI, Riv. di clin. pediat. **35**:193 (March) 1937.

A boy was followed from the age of 8 months until he died, eleven months later, of the Hand-Schüller-Christian disease. The clinical manifestations were fever, adenopathy, cutaneous hemorrhages, enlargement of the liver and spleen and pathologic changes in the bones. Biopsy of a lymph gland ten months before

death demonstrated hyperplastic reticulo-endotheliosis; at autopsy the characteristic lesions of the Hand-Schüller-Christian disease were observed, especially in the lymphatic glands, thymus, parathyroids and bones.

The belief is expressed, in view of the observations in this case, that the Hand-Schüller-Christian disease is primarily reticulo-endotheliosis of an infectious nature and that it later develops into granuloxanthomatosis. This article is of considerable length (seventy pages), is accompanied by many illustrations—photographic, histologic and roentgenographic—and is a complete monograph.

HIGGINS, Boston.

COOLEY'S ERYTHROBLASTIC ANEMIA. H. LEHNDORFF, Ergebn. d. inn. Med. u. Kinderh. **50**:568, 1936.

This article represents a historical, clinical, hematologic and pathologic review of Cooley's disease. It does not lend itself readily to abstracting. It is simply a detailed repetition of the criteria that Cooley and others have described.

CAPPER, Philadelphia.

AGRANULOCYTOSIS AND SUSCEPTIBILITY TO AMINOPYRINE. H. DISSELMEYER and O. ZORN, München. med. Wchnschr. **84**:247 (Feb. 12) 1937.

A woman 45 years of age was treated for arthritis of several years' duration. She received physical therapy and medication including aminopyrine. After she had taken aminopyrine for some time her temperature rose to 39.2 C. (102.6 F.) and her pulse rate to 120. She complained of sore throat, malaise, sweating and chills. There was a small area of necrosis on the lower gum. A blood count revealed 2,100 leukocytes, with 2 per cent segmented forms. The use of aminopyrine was discontinued, and the patient recovered.

A month later she was given 1 Gm. of aminopyrine as an experiment. During the next ten hours the total leukocyte count dropped from 15,000 to 4,000 and then gradually rose. The patient recovered.

The therapeutic doses of aminopyrine are not large enough to cause chemical intoxication. Agranulocytosis apparently occurs in susceptible persons who during treatment with aminopyrine acquire an idiosyncrasy to the drug.

BRAHDY, Mount Vernon, N. Y.

RETICULO-ENDOTHELIUM OF THE SPLEEN IN ESSENTIAL THROMBOPENIA. J. WAHLBERG, Arb. a. d. path. Inst. d. Univ. Helsingfors **8**:206, 1935.

In three cases of essential thrombopenia the reticulo-endothelial cells of the spleen showed signs of increased activity, but whether this was primary or a reaction to the thrombopenia could not be determined. In the normal spleen the reticulo-endothelial cells may contain structures (chondriosomes, Golgi apparatus) which suggest internal secretion, and in thrombopenia these structures in the spleen present appearances that suggest hypersecretion.

FROM THE AUTHOR'S SUMMARY. [ARCH. PATH.]

ELECTROCARDIOGRAPHICAL CHARACTERIZATION OF THE HEART IN OLD AGE AND IN CHILDHOOD. I. GELMAN and S. BROWN, Acta med. Scandinav. **91**:378, 1937.

Sixty so-called normal persons over 60 years of age were compared with school children of prepubertal age. Sinus arrythmia was found in 62 per cent of the children but in only 12 per cent of the elderly persons. The latter never showed extrasystole in the form of allorythmia. The PR interval and similarly the QRS complex were shorter in the children. The T wave was never negative in the children except in the third lead. ST never showed downward displacement in the children, but it did in 50 per cent of the aged persons. These changes are not simply the result of arteriosclerosis. Less lability of the extracardiac nervous regulation and metabolic changes in the myocardium (e. g., less glycogen) in the aged persons are offered in explanation.

KAJDI, Baltimore.

HEPARIN FOR SEDIMENTATION REACTION IN PEDIATRICS. J. H. MAGNUSSON and S. AHNSJÖ, Acta pædiat. **19**:412, 1937.

A technic is described for determining the sedimentation rate of the erythrocytes with approximately 0.7 cc. of blood; a small drop of 0.5 per cent solution of heparin is used to prevent coagulation. The results obtained were compared with those obtained by Enocksson's method; the latter is the same as Westergren's, except that heparin is used as the anticoagulant. In the range of the normal the values obtained by the two methods were found to agree closely; in the range of the pathologic the values obtained by the micromethod were somewhat lower than those obtained with the larger tubes.

McCUNE, New York.

THE RED BLOOD CELL PICTURE IN HEALTHY INFANTS. N. FAXÉN, Acta pædiat. (supp. 1) **19**:1, 1937.

Numerous studies have been made of the concentration of hemoglobin and the number of erythrocytes in the blood of infants during the first year of life. However, the sole aim of the majority of these investigations has been to supply "average" values; few have pretended to include only infants who were entirely healthy. For this reason, knowledge concerning the "normal," or optimal, values for hemoglobin and red blood cells during the first year is incomplete and unsatisfactory. To fill this gap of clinical information is the difficult objective of the present study. Specifically, none of the infants included in the study weighed less than 3,000 Gm. at birth. All were breast fed exclusively until 3 months of age and partially until 9½ months of age; fruit juices were given at 3 months; vegetables and stewed fruit, at 6 or 7 months. By 8½ months the infants were receiving two breast meals and three meals of mixed fare daily. The latter included milk, bread and butter, cereal and fruits. Cod liver oil was administered during the dark seasons of the year. Apparently meat, fish and eggs were not allowed the first year of life. All of the children lived in their own homes during the period of the study. All received careful medical inspection at regular intervals. None exhibited evidence of more than trivial infections during the period covered by the observations. Those who gave a history or showed physical evidence of other than extremely mild infections were excluded from the series. From a racial point of view the material was homogeneous, consisting entirely of infants who were born in Göteborg, Sweden. The study extended over a period of five years. The material consisted of 374 infants, 116 of whom were newly born. Approximately 600 estimations were made of the concentration of hemoglobin and of the number of red cells, respectively, about 400 reticulocyte counts and 165 measurements of the mean diameter of the red blood cells. Meticulous care was exercised in obtaining the samples of blood. All were taken at approximately the same time of day and at the same period after the ingestion of food. The determinations of hemoglobin were made by the method of Autenrieth and Königsberg. The apparatus was standardized against measurements of oxygen-combining capacity. The concentration of hemoglobin was recorded in grams per hundred cubic centimeters of blood. The red cells were counted in a standardized chamber. The reticulocyte counts were made on stained dried preparations. The mean diameter of the red corpuscles was also determined on dried films by a photographic modification of the Price-Jones technic. The results were analyzed statistically, with employment of formulas which bear the approbation of common use.

In the first week of life the mean value for the concentration of hemoglobin was found to be about 22.7 Gm. per hundred cubic centimeters; the concentration fell during the first three months of life to 12.7 Gm. at the third month. At this point a moderate rise occurred, to 13.7 Gm., which was attained at the fifth month. This level was maintained during the remainder of the first year of life. The number of red blood cells in newly born infants was approximately 5,500,000 per cubic millimeter; from this point it declined to 3,900,000 between the second and

third months. At the fifth month the concentration was approximately 4,500,000; it remained fairly constant at this level during the remainder of the first year.

The number of reticulocytes was found to be above 2 per cent during the first few days of life but fell as early as the end of the first week to values below 0.5 per cent. The decrease continued up to the age of 1 or 2 months, when a brief and not entirely clearcut rise occurred. During the remainder of the first year of life, the concentration of reticulocytes remained rather low.

The mean concentration of hemoglobin per single erythrocyte was computed to be high during the first week of life (above 40 micromicrograms. The concentration declined thereafter, falling to 30 micromicrograms by the end of the first semester. It remained constant at this level during the remainder of the first year.

Marked anisocytosis was found to be a characteristic of the blood of newly born infants. The mean diameter of the red cells was approximately 8 microns. In the following months the red cells exhibited greater uniformity of size, and the mean diameter decreased to about 7.15 microns during the second semester.

The foregoing values could not be shown to be subject to seasonal influences.

The physiologic significance of the author's findings is discussed briefly. The detailed report of the investigative data is prefaced by a well rounded review of the pertinent literature. The paper is copiously documented. Fifty-four pages are given over to records of the blood studies which form the basis of the report. This paper approximates a model of perfection for those who plan similar studies. Faxén was fortunate in having Mr. Owen Morton to translate his paper into English. The latter is to be congratulated on the lucid and pleasing English of his translation.

McCune, New York.

Diseases of Nose, Throat and Ear

Use of Sulfur Dioxide in Treatment of the Epidemic Cold. A. G. Rawlins, Arch. Otolaryng. **25**:119 (Feb.) 1937.

The filtrable viruses attacking plants, animals and man are similar in chemical and physical properties and do not behave toward ordinary antiseptics as do visible bacteria. Low concentrations of sulfur dioxide destroy plant viruses. Eighty persons in the first stages of a common cold of the epidemic type received sulfur dioxide inhalations. Sixty-six were cured on the first or second day after treatment, whereas previously from seven to fourteen days passed before the cold left. The method of making and prescribing the sulfur dioxide is given.

Greenwood, Chicago.

A Statistical Study of Allergic (Vasomotor) Rhinitis. J. A. Clarke Jr. and H. L. Rogers, Arch. Otolaryng. **25**:124 (Feb.) 1937.

The authors report 186 cases of uncomplicated allergic rhinitis in persons from 3½ to 66 years old. They stated that mucosal edema, present in bronchi and sinuses, produces a rather typical x-ray picture. Here cases in which pollen reactions were positive were excluded. House dust, feathers and orris root are the chief offenders. Food testing is now of no value. The intradermal testing technic is best. The treatment is carried on by removal of allergens and by hypodermic injections until clinical relief is obtained. Silent foci (granulomas at the apexes of teeth, infected sinuses, tonsils, etc.) are treated. When infection is present with negative skin reactions, vaccines, both stock and autogenous, are used. In specific allergic treatment added stock vaccine frequently is of great help. Satisfactory results were present in 79 per cent.

This is the simplest form of allergic respiratory disease and frequently precedes complicating hay fever and asthma. Females are most susceptible. Patients with allergic rhinitis are more apt to get scarlet fever than those with hay fever or asthma.

Greenwood, Chicago.

THROMBOSIS OF THE SIGMOID SINUS: A CLINICAL ANALYSIS. J. H. MAXWELL, Arch. Otolaryng. **25**:185 (Feb.) 1937.

Thrombi may be mural or occluding. The otitis producing thrombosis of the sigmoid sinus may do so by direct extension from prolonged infection or through thrombophlebitis of the mastoid veins, seen in acute conditions. The treatment for the majority is section and exteriorization of the internal jugular vein, while the sigmoid sinus is dealt with according to the local pathologic changes. An outline schema of treatment is commendably presented. The thrombophlebitic type seen in acute mastoiditis is stressed and early intervention advised. Blood cultures are of questionable diagnostic aid when positive prognosis is more grave. Wide exposure of the sigmoid is routine. Fifty-two cases show that thrombosis secondary to chronic middle ear infection does badly; prognosis is better in children under 16 years. Early diagnosis and adequate treatment are stressed.

GREENWOOD, Chicago.

SPREADING OSTEOMYELITIS OF THE FRONTAL BONE SECONDARY TO DISEASE OF THE FRONTAL SINUS, WITH A PRELIMINARY REPORT AS TO BACTERIOLOGY AND SPECIFIC TREATMENT. H. L. WILLIAMS and F. R. HEILMAN, Arch. Otolaryng. **25**:196 (Feb.) 1937.

In a consideration of thirteen cases three clinical types of osteomyelitis of the frontal bone secondary to disease of the frontal sinus are recognized: a fulminating, a localizing and a spreading type. The reasons for this classification are given and the methods of surgical and specific therapy set forth. From two cases an anaerobic streptococcus was obtained. The method of isolation of the organism and the preparation of antivirus are given.

Because of the isolation of this organism and the results from specific therapy, it is concluded that the causative organism may have been isolated, namely, an anaerobic streptococcus. Staphylococci frequently are present in sinuses which have been operated on without producing complicating osteomyelitis.

GREENWOOD, Chicago.

CONSERVATIVE TREATMENT OF THE NASAL SINUSES. H. HAYS, New York State J. Med. **37**:137 (Jan. 15) 1937.

Hays feels that too many antrums are punctured unnecessarily and that too many operations are performed on the sinuses. The majority of the patients will recover under conservative treatment. Rarely in children acute symptoms make operative treatment imperative. In the majority of children, even with positive evidence by transillumination or roentgenography, conservative treatment is to be preferred.

As treatment Hays mentions local applications of cocaine and ephedrine, exposure to infra-red rays and washing the nasal cavities with an alkaline solution, followed by an oil spray. Efforts should be made to improve the general condition and nourishment. A change in climate is of great value.

In the discussion of this paper, Voorhees, of New York City, challenged the statement that "the conscientious rhinologist can cure 99 per cent of so-called sinus conditions by conservative methods."

AIKMAN, Rochester, N. Y.

ORTHOPHONIC CLINICS IN AUSTRIA, DENMARK AND GERMANY. I. MARTHA VIÉ, Rev. méd.-sociale de l'enf. **5**:39 (Jan.-Feb.) 1937.

The author divides orthophonics into two groups: (1) the care of patients who present some local trouble which interferes with normal speech and (2) the study of those whose speech defect is not dependent on a local lesion. The remainder of the paper is essentially a review of the development of speech clinics

in the three countries named, with a eulogy addressed to Dr. Gutzmann, of Berlin, for perfecting an "artificial voice" to be used in the patient who is forced to undergo total laryngectomy.

DIETRICH, Los Angeles.

VALUE OF ANISOCORIA IN THE DIAGNOSIS OF OTITIS MEDIA IN INFANCY. S. JANNUZZI, Pediatria **45**:39 (Jan.) 1937.

Jannuzzi describes at length an acute sympathetic syndrome of middle ear infection in children.

In his report he presents only two cases in which spontaneous anisocoria was shown; in the remaining cases the pupillary inequality had to be demonstrated by means of drugs. In the majority of cases he revealed miosis of the eye on the side of the affected ear, and in two cases he met with mydriasis. He feels that an inflammatory or a destructive process of the middle ear can provoke excitability or destruction of the sympathetic fibers that run in the middle ear and states that this sign constitutes a helpful symptom in the diagnosis of otitis in children.

PALMIERI, Brooklyn.

ECTOPIC BENIGN GROWTHS OF THYMUS AND THYROID TISSUE IN THE LARYNX. P. FALK, Arch. f. Ohren-, Nasen- u. Kehlkopfh. **141**:118, 1936.

Falk shows that thymus tissue occurs rarely and thyroid tissue frequently within the larynx, and that both tissues develop into tumors. Intralaryngeal thyroid tumors are comparatively frequent; thymus tumors are rare. He describes a case of thymus tumor in the subglottic space of an 8 week old nursling. The infant died after an operation. The observations at necropsy and the microscopic aspects of the tumor are described. Falk points out that between the cricoid cartilage and the first tracheal ring intralaryngeal thyroid or thymus tissue is always connected with the main gland, in the case of the thyroid, or with accessory parts, in the case of the thymus. In contradistinction to Paltauf's theory of ingrowing and Bruns' untenable theory of embryonal scattering, he advances, on the basis of systematic investigations, a better-founded embryologic theory, according to which between the cricoid cartilage and the first tracheal ring there take place during the early embryonal period a displacement and an inhibition of the retrogressive development of thyroid and thymus tissue. This would explain the occasional appearance of islands of thyroid and thymus tissue in the larynx. On account of the anatomic conditions in the subglottic space, both types of tumor have almost always the same location—in the region of the posterior wall. The thymus and thyroid tissues develop during the period of growth of the matrix tissue. With regard to the differential diagnosis, the author says that practically always a subglottic tumor in the first few months of life is a thymus tumor.

EDITOR'S ABSTRACT. [ARCH. OTOLARYNG.]

CONGENITAL ABNORMALITIES OF THE EXTERNAL AUDITORY MEATUS: SQUAMOUS CELL EPITHELIAL CYST OF THE TYMPANIC MEMBRANE. H. WULLSTEIN, Arch. f. Ohren-, Nasen- u. Kehlkopfh. **141**:150, 1936.

Wullstein describes the clinical and histologic aspects of a cyst the size of a pea, which was covered externally and internally with several layers of squamous cell epithelium and which was located where Shrapnell's membrane passes into the anterior upper wall of the auditory meatus. From the location of the cyst and from its internal and external lining with squamous cell epithelium, one could deduce that it was a congenital deformity of the external auditory meatus. The deformity did not cause difficulties until secondary inflammatory manifestations developed. These led to clinical examination and observation of the cyst. In the differential diagnosis consideration was given to the possibility of cerebral tumor, cerebral hernia and cholesteatoma with labyrinthine fistula until the histologic examination clarified the problem.

EDITOR'S ABSTRACT. [ARCH. OTOLARYNG.]

DIAGNOSIS OF HEREDITARY DEAFNESS IN A PATIENT WITH LATERAL DISTRIBUTION OF RESIDUAL HEARING AND OF VESTIBULAR EXCITABILITY. E. WIRTH, Arch. f. Ohren-, Nasen- u. Kehlkopfh. **141**:212, 1936.

Wirth points out that Langenbeck formulated the so-called law of symmetry of hereditary deafness, maintaining that symmetry of residual hearing is one of the most reliable proofs that the deafness is hereditary. In view of the great importance of this law for the estimation of the nature of deafness, Wirth decided to investigate its reliability on 100 deaf-mutes in whom the aspects of the tympanic membrane gave no indication of a former inflammation of the middle ear. Among these deaf-mutes without tympanic changes there were 76 in whom the defect was congenital, whereas in 24 the deafness was probably acquired. In 39 of the cases of congenital deafness there was no evidence of hereditary transmission, but in 37 there was such evidence. The results of tests show that, in conformity with Langenbeck's observations, symmetry of residual hearing is found considerably more often in persons with records indicating hereditary deafness than in those for whom there is no evidence of hereditary defect. However, there were some patients with hereditary deafness in whom the residual hearing differed on the two sides, so that in doubtful cases the differences between the two sides cannot be cited as proof against inheritance. Wirth regards as definite proof of the hereditary character of deafness the identical hearing curves for deaf-mute siblings. Symmetrical remnants of hearing are only to a certain extent indicative of the hereditary character of deafness, and differences in the residual hearing capacities of the two sides cannot be cited as proof against the hereditary nature of deafness.

EDITOR'S ABSTRACT. [ARCH. OTOLARYNG.]

TONSILLECTOMY AND THE VOICE. H. DROSTE, Hals-, Nasen- u. Ohrenarzt (Teil 1: Folia oto-laryng.) **27**:81 (July) 1936.

Droste reviews the literature on the effect of tonsillectomy on the voice and then reports his own studies on patients who had undergone tonsillectomy. He finds that in the majority of cases tonsillectomy changes neither the speaking nor the singing voice. Improvement of the voice frequently occurs after tonsillectomy, if the operation has been performed with caution, and the pillars of the fauces have not been greatly injured and the scar formation has not produced deformity and distortion. The voice may become impaired after tonsillectomy if as a result of greater injuries in the course of the operation the pillars of the fauces or the soft palate have become distorted by severe cicatrization. Neglect of vocal exercises at the proper time after the operation may likewise result in impairment of the voice. Occasionally there is a change in the range of the voice. In some tenors, for instance, there may be a temporary lowering of the voice. Prolonged subjective difficulties (sensation of tension) result when there is extensive cicatrization. In law suits based on impairment of the voice after tonsillectomy, the physician rendering expert testimony should consider (1) that difficulties (adhesions) may be encountered in the course of an operation which require a more radical procedure, (2) that the condition of the voice cannot be estimated before one year has passed, (3) that the voice may have been impaired before the operation and (4) that not all nervous (often extremely subjective) sensations can be ascribed to tonsillectomy.

EDITOR'S ABSTRACT. [ARCH. OTOLARYNG.]

IS THE LYMPHATIC TISSUE IN THE NASOPHARYNX A PROTECTION AGAINST INFECTION? G. EIGLER, München. med. Wchnschr. **84**:284 (Feb. 19) 1937.

The old theory that the lymphatic tissue in the nose and throat is a barrier to systemic infection is no longer tenable. Phagocytic cells, which are essential in the protection against invading organisms, are absent or sparsely present in the tonsils and adenoids. Eigler fails to find histopathologic or biologic evidence that the tonsils and adenoids aid in the development of antibodies. After surgical removal of these tissues a patient is less susceptible to catarrhal pharyngitis, diphtheria and scarlet fever.

BRAHDY, Mount Vernon, N. Y.

Diseases of Lungs, Pleura and Mediastinum

VACCINE TREATMENT OF ASTHMA IN CHILDHOOD. EMILE NAEF, New Orleans M. & S. J. **89**:404 (Feb.) 1937.

Naef used a stock vaccine, mixed pertussis and mixed catarrhalis. He reports his results in fourteen cases. The vaccines were used for nonspecific protein desensitization and were not considered as specific antigens. Skin tests were purposely omitted. Doses were 0.33 cc. and 0.66 cc., forty-eight hours apart, followed by three 1 cc. doses at the same intervals, then three 1 cc. doses at weekly intervals. The patients' ages varied from 14 months to 12 years. In 68 per cent there resulted complete inhibition of allergic spasm; in 18 per cent the condition was improved in respect to recurrence and severity, and 14 per cent obtained no relief. These results correspond perfectly with those of other authors reporting the use of either autogenous or stock vaccines. The cases collected for this summary numbered 579, and cures are reported in 60 per cent—an imposing average.

BERKLEY, Los Angeles.

SURGICAL TREATMENT OF EMPYEMA. KENNEDY CREEVEY, New York State J. Med. **37**:645 (April 1) 1937.

Thirty-seven patients with empyema were treated by open drainage, with a mortality of 11 per cent.

AIKMAN, Rochester, N. Y.

RÔLE OF HOUSE DUST IN BRONCHIAL ASTHMA. W. B. BUFFUM, Rhode Island M. J. **20**:19 (Feb.) 1937.

The current knoweledge of the relation of house dust to bronchial asthma has been briefly reviewed and the methods of diagnosing and treating sensitivity to house dust discussed. The results in sixty-four patients treated with special reference to house dust as a factor have been tabulated. In twelve of the 64 children with bronchial asthma house dust seemed to be the important cause of the attacks. In all of the sixty-four patients, in addition to other forms of treatment, especial attention was paid to decreasing the amount of dust in the home, and this seemed to be of considerable benefit.

FROM THE AUTHOR'S SUMMARY. [BUFFUM, Providence, R. I.]

INTERSTITIAL BRONCHOPNEUMONIA IN CHILDREN. J. S. WALL, South. M. J. **30**:201 (Feb.) 1937.

Interstitial bronchopneumonia is a secondary disease and often follows or occurs simultaneously with such infections as measles, influenza, whooping cough, diphtheria, scarlet fever and dysentery. It occurs most frequently in children between the ages of 1 and 4 years.

The inflammation, markedly interstitial, involves the walls of the bronchi and surrounding vesicles, producing pus and fibrin as well as organized tissue in the cavities of the vesicles.

The symptoms of the disease are similar to those of primary bronchopneumonia. The onset is insidious, often masked by the acute disease to which it is secondary. The disease persists week after week, is accompanied by diarrhea and vomiting and after about six weeks presents the appearance of pulmonary cachexia, often simulating advanced phthisis. The prognosis is not good.

If no improvement is shown in five or six weeks, the patient usually succumbs. In cases of recovery the course is slow and tedious, with danger of relapse.

In treatment emphasis should be on prevention. Isolation during epidemics of children's diseases, with prevention of diphtheria, measles and other conditions, is urged.

SCHULTZ, Chicago.

CONTINUOUS OPEN AIR FOR PNEUMONIA IN CHILDREN. H. L. WALLACE, Brit. M. J. **1**:657 (March 27) 1937.

Acute primary pneumonia is the type treated in this manner. In one of the wards at the Children's Hospital in Edinburgh every child on entry was subjected to an intensive open air regimen, irrespective of the season of the year or weather conditions, with the exception of fog. Each child was well clothed and was placed on the windward side of the ward beside a widely opened window. The author thinks the air should play directly on the child's face. In 300 consecutive cases this manner of treatment was used. A control group of 275 patients were treated in another fashion in a separate ward. They were not subjected to the cold weather and open air regimen but were treated with the continuous administration of oxygen. Stimulants were used, as well as the inhalation of air moistened with steam.

Of the group of 292 patients treated in open air, 134 were under 2 years and 158 were over 2 years of age. Thirty of the patients less than 2 years of age died, a percentage of 22.4; 4 of those over 2 years of age died, a percentage of 2.5. In the control group there were 136 under 2 years and 139 over 2 years of age. Fifty-one of those less than 2 years of age died, a percentage of 37.5; 8 of those over 2 years of age died, a percentage of 5.8.

The author's summary is as follows: The importance of open air as a therapeutic measure in acute primary pneumonia in children is emphasized, and the belief is expressed that the value of this remedy is not sufficiently appreciated at present. A comparison is made between a series of patients treated according to an intensive open-air regimen and a control group of patients treated by other measures. Exposure to a moving current of cold fresh air throughout the whole febrile period is advocated in all types of pneumonia in children of all ages, and it is suggested that if this simple expedient were to supersede certain of the more meddlesome forms of therapy frequently employed the lives of many children would be saved.

ROYSTER, University, Va.

A CASE OF BRONCHIECTASIS. C. GIANELLI and M. E. MANTERO, Arch. de pediat. d. Uruguay **7**:473 (Oct.) 1936.

Following pertussis a young girl began to have attacks of fever and cough, with blood-streaked expectoration. Roentgenoscopic examination revealed pleuropneumonic infiltration first at the base of the left lung and some time later on the right. Her health was poor in the interval. Iodized poppy-seed oil 40 per cent was introduced and a saccular bronchiectatic cavity visualized. She had had a positive tuberculin reaction since her first visit, but the sputum was always free from bacilli. The condition was cured completely after the iodized oil was given.

SCHLUTZ, Chicago.

RESPIRATORY CAPACITY IN VARIOUS DISEASES. E. PÜSCHEL, Monatschr. f. Kinderh. **69**:377 (March) 1937.

This article is a continuation of reports and tables on the vital capacity in such conditions as bronchiectasis, thoracic deformity, asthmatic bronchitis, heart failure, obesity and miscellaneous conditions. Püschel hopes that some practical use may be made of these studies.

GERSTLEY, Chicago.

TWENTY CASES OF SPONTANEOUS PNEUMOTHORAX IN CHILDREN. W. RASENACK, Ztschr. f. Kinderh. **58**:95, 1936.

Spontaneous pneumothorax is quite rare in children, although more common than in adults. Pulmonary tuberculosis is a much less common etiologic factor of the disease in the child than in the adult.

Twenty cases of spontaneous pneumothorax in infants observed in the Universitäts-Kinderklinik Hamburg-Eppendorf are reported. The general mortality was 35 per cent.

Pneumothorax in which there is a valvular opening permitting air to enter but not to leave the pleural cavity is serious. It is treated by thoracotomy or by thoracentesis.

A close relationship exists between pneumothorax and mediastinal or subcutaneous emphysema. In the latter, rupture probably occurs into the interstitial pulmonary tissues and air spreads thence to the mediastinal and subcutaneous tissues.

SIEMSEN, Chicago.

MARGINAL SHADOWS PROXIMAL TO THE PLEURA IN THE ROENTGEN PICTURE. C. BENNHOLDT-THOMSEN, Ztschr. f. Kinderh. **58**:523, 1936.

Marginal shadows in the pleural region have been the subject of much discussion. Most authors regard them as pathologic. Bennholdt-Thomsen found them in one third of 882 plates taken at the Greifswald University Children's Clinic. The shadows occurred in the absence as well as in the presence of clinical and roentgenologic pulmonary findings. In some cases autopsy revealed no anatomic basis for them. Knuttson's explanation that the shadows are produced by the costal musculature seems plausible. The fact that these shadows do not extend below the level of the eleventh rib aids in ruling out pleurisy. However, differentiation between pathologic and normal shadows may be impossible roentgenologically, and every case must be considered individually.

SIEMSEN, Chicago.

ATELECTASIS OF THE UPPER LOBE OF THE LUNG IN CHILDREN. M. DE BRUIN, Nederl. tijdschr. v. geneesk. **81**:1124 (March 13) 1937.

A number of cases of atelectasis of the upper lobe of the lung in children are described. Attention is drawn to the clinical and roentgenographic picture of isolated obstruction of the axillary bronchus, the relatively frequent occurrence of which is explained by the anatomic configuration of the upper lobe. It is considered that frequently from the roentgenogram a diagnosis of pneumonia or interlobar pleurisy is made in cases in which the picture is caused by atelectasis. Finally, the relatively favorable prognosis in atelectasis of the upper lobe of the lung is pointed out, being ascribed to the marked tendency to spontaneous reventilation.

VAN CREVELD, Amsterdam, Netherlands.

Diseases of the Gastro-Intestinal Tract, Liver and Peritoneum

LYMPHOSARCOMA OF THE STOMACH. E. N. COLLINS and M. G. CARMODY, Am. J. Digest. Dis. & Nutrition **3**:884 (Feb.) 1937.

In this interesting report of four cases, one is impressed first by the diagnostic difficulties encountered, which are reviewed. Roentgen examination of the stomach may show no evidence of abnormality until late in the course of the disease, as the mucosa may not be involved prior to that time. The records of two cases of lymphosarcoma are added to the literature. In dealing with an obscure diagnostic problem involving the stomach, the rare possibility of sarcoma and its different pathologic progress as compared with that found in carcinoma should be considered.

The ages of these four patients were 9, 55, 55 and 68 years. In the case of the 9 year old boy, the surgical specimen removed weighed 900 Gm. The pathologic diagnosis of lymphosarcoma of the stomach was made. The remarkable thing about this patient is that he is living and well twenty-two years after operation, with no evidence of recurrence.

MORRISON, Savannah, Ga.

VOLVULUS OF AN INVERTED INTRATHORACIC STOMACH COMPLICATING DIAPHRAGMATIC HERNIA—CASE REPORT. A. BOWEN, Am. J. Digest. & Nutrition **3**:923 (Feb.) 1937.

Bowen reports a case with the observations at autopsy. The diaphragmatic hernia was undoubtedly congenital. The onset of symptoms (other than those

of childhood, which consisted of tiring easily in any strenuous physical exercises) occurred when the patient was 31 years of age, and recurrent attacks, directly attributable to the volvulus of the inverted intrathoracic stomach, were frequent until death of the patient at the age of 40 years. MORRISON, Savannah, Ga.

PEPTIC ULCER IN CHILDREN: A FOLLOW-UP STUDY OF CASES REPORTED PREVIOUSLY AND A REPORT OF ADDITIONAL CASES. J. BLOCH and A. M. SERBY, Am. J. Digest. & Nutrition **4**:15 (March) 1937.

Eight additional cases of peptic ulcer are reported, and the subsequent course in four of five previously reported ones is reviewed.

Attention is directed toward the importance of the family history in the diagnosis of duodenal ulcer.

Ambulatory management seems to suffice in nearly every patient, and complications are comparatively rare. MORRISON, Savannah, Ga.

ATRESIA OF THE PYLORUS. R. J. BENNETT JR., Am. J. Digest. Dis. & Nutrition **4**: 44 (March) 1937.

A case of atresia of the pylorus (congenital) is reported, with operative notes and autopsy observations. A suggestion is made that a catheter should be passed by mouth so as to be sure of producing gastro-intestinal continuity and avoiding peritonitis, which is so often fatal in the new-born.

From the picture of the specimen in this article, the case is apparently one of atresia involving the pylorus and also the first portion of the duodenum.

MORRISON, Savannah, Ga.

PRIMARY PNEUMOCOCCIC PERITONITIS: RECOVERY OF THE ACUTE SEROUS TYPE FOLLOWING TYPE I SERUM TREATMENT WITHOUT SURGICAL INTERVENTION. M. M. GLAZIER, B. I. GOLDBERG and A. A. WEINSTEIN, Ann. Int. Med. **10**:1042 (Jan.) 1937.

The patient was a girl of 5 years. A complete history of the case is given. The mode of infection and the diagnosis of primary pneumococcic peritonitis are discussed in some detail. Pneumococci of type I were present in a fourteen hour culture. A chart is appended giving the details of treatment and the amounts of antipneumococcus serum used. Complete recovery without complications resulted.

READING, Galveston, Texas.

JEJUNAL INTUSSUSCEPTION. E. B. FREILICH and G. C. COE, Ann. Surg. **105**:183 (Feb.) 1937.

The authors review the literature and report a case of jejunal intussusception occurring in a boy aged 9. At operation a gangrenous portion of bowel was found and resected, with recovery.

According to the authors the condition is rare, only twenty-nine cases having been reported from 1852 to 1934. Of these, fifteen were in males and most of them in adults. The condition is therefore spoken of as an adult type of intussusception.

The classic picture of intussusception in infancy is rarely seen in the jejunal type except in the acute stages of the latter. In most cases there is a history of chronic abdominal pain, occasional emesis, epigastric distress and constipation, followed by an acute onset of abdominal pain, repeated emesis, distention, tenderness and muscle spasm. Collapse may occur as an initial symptom.

The treatment is early surgical intervention. BANTIN, Omaha.

INTESTINAL ATRESIA. J. D. MARTIN JR. and D. C. ELKIN, Ann. Surg. **105**:192 (Feb.) 1937.

Two cases of single congenital atresia involving the same portions of the small intestine are reported. One patient was operated on three days after birth, with complete recovery. The other was operated on two days after birth and died fifteen hours after the operation.

The authors believe that in spite of the high mortality, if congenital atresia is diagnosed early and adequate surgical treatment instituted, it is possible to avoid a fatal issue.

The presence of multiple stenoses of the small intestine assures practically 100 per cent mortality.

BANTIN, Omaha.

VINCENT'S STOMATITIS AS A CAUSE OF OBSCURE FEVER. H. L. EDER, Arch. Pediat. **54**:166 (March) 1937.

Eder reports three instances of prolonged fever in children which he purports to be due to Vincent's stomatitis. No report on cultures from the mouth is submitted.

ORR, Buffalo.

INFLUENCE OF CERTAIN DRIED FRUITS AND ABSORBING AGENTS ON THE INTESTINAL FLORA OF WHITE RATS. L. WEINSTEIN and J. E. WEISS, J. Infect. Dis. **60**:1 (Jan.-Feb.) 1937.

Banana powder, apple powder and raisins when fed to white rats subsisting on a high protein diet consisting exclusively of raw chopped beef cause a change in the intestinal flora from one in which nonaciduric bacteria predominate to one in which Bacillus acidophilus is the outstanding organism.

Prunes, charcoal and kaolin do not have any visible effect on the intestinal flora of white rats.

The exact explanation for the action of banana, apple and raisins is not apparent, but it is quite probable that the carbohydrate and mineral contents of these fruits are of prime importance in their ability to establish an intestinal flora rich in Bacillus acidophilus.

TOOMEY, Cleveland.

ACUTE "PRIMARY" STREPTOCOCCUS PERITONITIS. J. S. LEOPOLD and R. E. KAUFMAN, J. Pediat. **10**: 45 (Jan.) 1937.

Leopold and Kaufman report twelve cases of streptococcic and one case of staphylococcic "primary" peritonitis. Only one of the patients recovered. The close relationship between streptococcic infection of the throat and streptococcic peritonitis is pointed out. The portal of entry in most cases is the nasopharynx, and the bacteria reach the peritoneum either through the blood stream or through the intestines. The importance of abdominal paracentesis before operation is considered is emphasized. The authors feel that immediate operation is indicated in most cases of streptococcic peritonitis and delayed operation in most cases of pneumococcic peritonitis. Besides operation, they recommend energetic specific serotherapy in addition to transfusions and infusions. The mortality rate in streptococcic peritonitis is approximately 85 per cent; with operation it is about 80; without operation it is about 95 per cent.

RAUH, Cincinnati.

APPLE POWDER: ITS APPLICATION TO INTESTINAL DISORDERS; A SIMPLIFICATION AND IMPROVEMENT ON THE HEISLER-MORO RAW APPLE DIET. R. DE ROHAN BARONDES, Brit. J. Child. Dis. **34**:48 (Jan.-March) 1937.

It has been found that apple powder may be substituted for fresh apple in the treatment of acute and chronic disorders of the intestinal tract. In many respects it is superior to the raw apple. It is standard and stable. It is usually given in a 4 to 8 per cent suspension of boiled water. It may be readily mixed with milk without causing coagulation or curdling. It does not undergo oxidation.

Further study is necessary to determine how much of the beneficial effect may be due to the fruit acids by reason of their base-binding qualities and how much to the increased basic elements (sodium, potassium and calcium).

LANGMANN, New York.

RÔLE OF FUNGI AND ANAEROBES IN ACUTE DIARRHEA OF INFANTS. K. C. CHAUDHURI, Indian J. Pediat. **4**:11 (Jan.) 1937.

Six fatal cases of acute diarrhea in infants are described. The clinical course was featured by from three to six orange-yellow stools, intermittent fever, progressive pallor, drowsiness, coma and death. The outbreak was of epidemic appearance and occurred in a very hot summer season. A fungus was constantly present in the stools. A foamy liver was found at autopsy in one case, and this led to a search for anaerobic organisms. Such organisms were cultured in another case. The possible etiologic relationship of this fungus and anaerobes to the clinical syndrome described is discussed.

GANCE, Madison, Wis.

CIRRHOSIS OF THE LIVER IN NORTHERN CIRCARS (SOUTH INDIA): TOXIC CIRRHOSIS. M. V. R. RAO, J. Indian M. A. **6**: 304 (March) 1937.

Subacute toxic cirrhosis of infants is a progressive and rapidly fatal disease of unknown etiology commonly seen in the children of middle-class and wealthy vegetarian Hindus, between the ages of 1 and 3 years. It is characterized in the early stages by progressive, persistent and painless enlargement of the liver, irregular intermittent fever and constipation, and in the latter stages by gradual contraction of the liver, jaundice, enlargement of the spleen and ascites. Histologically, the liver shows subacute necrosis of the parenchyma, extensive obliterative lesions of the smaller divisions of the hepatic venous tree and replacement fibrosis; attempts at regeneration of the hepatic parenchyma are usually not marked.

GONCE, Madison, Wis.

ABDOMINAL PAIN IN CHILDHOOD. K. B. FRASER, M. J. Australia **1**:280 (Feb. 20) 1937.

This article is a brief review of important abdominal conditions in childhood, special attention being given to diagnosis of appendicitis.

TENNEY, Madison, Wis.

MEGADUODENUM (SPECIMEN). T. PEARSE, Proc. Roy. Soc. Med. **30**:875 (Feb.) 1937.

The specimen was taken from a boy aged 10 months. In addition to the megaduodenum, the small intestine was massed together in the midline and the mesentery shortened. There was no hepatic flexure of the colon and the cecum occupied an almost central position with a short ascending colon passing across the duodenal-jejunal junction to become a short transverse colon.

The history of the child from birth is given.

WILLIAMSON, New Orleans.

CIRRHOSIS WITH JAUNDICE: CHOLECYSTOGASTROSTOMY. P. R. EVANS, Proc. Roy. Soc. Med. **30**:878 (Feb.) 1937.

A case in a girl of 9 years is reported in detail.

WILLIAMSON. New Orleans.

EXOMPHALOS ASSOCIATED WITH VOLVULUS NEONATORUM; RESULT SIX AND A HALF YEARS AFTER OPERATION. H. EDWARDS, Proc. Roy. Soc. Med. **30**:881 (Feb.) 1937.

Two hours after birth a baby was taken to a hospital because the umbilical cord had to be tied some distance away from the abdomen, the intervening portion

being broadened and fused at a wide base with the abdominal wall. Through this transparent membrane could be seen coils of intestine. These were blue and obviously congested. It was thought that a volvulus neonatorum coexisted with the exomphalos. The child was operated on and made a good recovery. Details of the operation are given in the report.

WILLIAMSON, New Orleans.

USE OF SALINE SOLUTIONS IN DIARRHEAS OF INFANCY. G. PAISSEAU, M. BOEGNER and C. VAILLE, Arch. de méd. d. enf. **40**:73 (Feb.) 1937.

The frequency and the gravity of major dehydration in the course of diarrhea in nurslings have induced the writers to undertake intravenous injections of hypertonic salt solutions in selected cases. They have been encouraged by the results of this treatment in occlusion of the bowel in adults.

From 2 to 5 cc. of 20 per cent sodium chloride solution constitutes the dose. In view of the objection made by Ribadeau-Dumas and his associates, who established the fact that in the great majority of infants with cholera there exists a state of acidosis with globular hyperchloremia, in contrast to the syndrome observed during the vomiting stage of stenosis, studies were made of the biochemical reactions during periods of dehydration in very young subjects, after the method of Raszjeva.

Comparative studies were also made on the index of chloremia following the use of dextrose and sodium bicarbonate solutions, given subcutaneously, and of lactose-Ringer's solution (as devised by Dr. Hartmann), administered intravenously.

Analogous results were obtained with hypertonic saline solution. Six clinical observations are reported in full, the ages of the babies ranging from 1 to 7 months. The entire series on which the contribution is based numbered 116 infants, of which 46 recovered and 70 succumbed. The view is offered that the small amount of sodium chloride introduced probably acts through the mechanism of shock.

AMESSE, Denver.

GASTRO-INTESTINAL NEUROPATHIES IN INFANCY. E. CIENFUEGOS, Arch. de pediat., Rio de Janeiro **9**:119 (Jan.) 1937.

Infants that have suffered from some general systemic disturbance may show this run-down condition in various gastro-intestinal disturbances. These are usually vomiting, diarrhea and failure to gain. If these infants are relieved of their monotonous diet and given a larger choice of foods, the condition clears rapidly. Four cases are discussed to illustrate this point.

SANFORD, Chicago.

THE VALUE OF THE RATIO CORPUSCLE CHLORIDE/PLASMA CHLORIDE IN THE MANAGEMENT OF SEVERE DIARRHEAS (TOXICOSES). F. HURTADO GALTÉS, Bol. Soc. cubana de pediat. **9**:92 (March) 1937.

Hurtado Galtés believes that the estimation of the ratio corpuscle chloride/plasma chloride, as advocated by the French school, is an accurate indication of the acid-base balance and should be determined in cases of severe diarrhea in order to establish proper therapy. He recommends different methods of treatment depending on the figures obtained for the chlorides. If the ratio is high (above 0.5) he uses a 2 to 4 per cent solution of sodium bicarbonate given parenterally. This is supplemented by an isotonic solution of dextrose with insulin whenever there is an absolute increase in the total chloride content, and by Ringer's solution when the high ratio is due solely to a diminution of the plasma chloride content. A diminution of the ratio is regarded as an indication of alkalosis. In this type of case he advises Ringer's solution or slightly hypertonic saline solutions. In any type of case he advocates blood transfusion, preferring Lindermann's method, and he also writes favorably of the use of continuous venoclysis.

SCHLUTZ, Chicago.

INFLUENCE OF DRUGS ON THE HUMAN CARDIA. B. HERZBERG, A. ROGOV and P. RUDNICKY, Deutsche Ztschr. f. Chir. **248**:65, 1936.

The authors studied the activity of the human cardia by means of kymograms based on the movements of a balloon sound. They studied the effect of average therapeutic subcutaneous injections of epinephrine (0.001 Gm.), atropine sulfate (0.001 Gm.), pilocarpine (0.005 Gm.) and physostigmine salicylate (0.00075 Gm.). The effect of these drugs on the cardia corresponded to their effect on the motor activity of the stomach. Epinephrine and atropine depressed the activity of the cardia, and pilocarpine and physostigmine had the opposite effect. Morphine caused a persistent relaxation of the cardia that allowed food to enter the stomach freely. However, under the influence of morphine, the middle portion of the stomach, corresponding to the sphincter antri pylori, underwent a spastic contraction that caused the food to remain several hours in the stomach.

GLASER, Rochester, N. Y.

MILLON'S TEST IN HEPATIC DISEASE. I. REICH, Monatschr. f. Kinderh. **69**:358 (March) 1937.

A positive Millon's test of the urine has been thought by some to be significant of damage to the parenchyma of the liver. As compared with the Takata reaction for tyrosine in the blood serum, Reich found the test valueless.

GERSTLEY, Chicago.

EFFECT OF ACETIC ACID ON INTESTINAL MOTILITY. W. CATEL, Monatschr. f. Kinderh. **69**:393 (March) 1937.

For some reason or other Catel feels that he must come to the defense of Czerny for the views expressed at the beginning of the century. At that time it was considered that infantile diarrheas were due to formation of acetic acid in the intestine. With profound disregard for all the work done in this country and with experiments of doubtful clinical value, the writer reopens the subject. Four infants were given milk mixtures containing acetic acid. A fifth was given sodium acetate instead of acetic acid. As the children either vomited or had some diarrhea, Catel thinks he has found evidence supporting the rather antiquated acetic acid theory of diarrhea.

GERSTLEY, Chicago.

PERFORATED DUODENAL ULCER IN A NINE YEAR OLD GIRL. MARIE VON LILIENFELD-TOAL, Monatschr. f. Kinderh. **69**:403 (March) 1937.

A case is reported of a 9 year old girl who was taken sick with symptoms of appendicitis. She was operated on within eleven hours after the onset, and a ruptured gastric ulcer was found. Recovery followed.

GERSTLEY, Chicago.

GLYCOGEN STORAGE DISEASE. F. ERBEN and F. KUSTER, Ztschr. f. Kinderh. **58**:178, 1936.

A boy 3 years and 9 months old showed retarded growth and ossification and a body build suggesting dystrophia adiposogenitalis. Observations typical of glycogen storage disease were made (morning excretion of acetone, hypoglycemia during fasting and absence of a rise in the blood sugar after injection of epinephrine). A roentgenogram showing an abnormal sella turcica lent support to the theory that hypophysial dysfunction plays a rôle in the pathogenesis.

SIEMSEN, Chicago.

INVESTIGATIONS REGARDING VITAL AND POSTMORTEM CARBOHYDRATE METABOLISM IN GLYCOGENOSIS AND DISTURBANCES OF THYROID FUNCTION. W. HERTZ, Ztschr. f. Kinderh. **58**:259, 1936.

This article is preceded by a report (Hertz and Jeckeln) of a case of glycogen storage disease complicated by myxedema. Investigation of the carbohydrate

metabolism showed marked but retarded and prolonged hyperglycemia induced by epinephrine with insufficient initial hyperglycemia induced by insulin. The blood sugar curve in the case of epinephrine may have been influenced by poor peripheral circulation.

Postmortem studies on an "organ pulp" of liver and heart showed little or no glycogenolysis at icebox temperatures but better glycogenolysis under favorable conditions of p_H and temperature. Addition of diastase accelerated glycogenolysis markedly, without previous splitting of protein. The hypofunction of the thyroid suggests the possibility of a complicted hypophysial dysfunction.

SIEMSEN, Chicago.

Nervous Diseases

EFFECT OF ENCEPHALOGRAPHY ON BLOOD SUGAR LEVEL OF CHILDREN. C. BRADLEY, R. V. HESS and R. M. CARY, Am. J. M. Sc. **193**:259 (Feb.) 1937.

Encephalography as commonly carried out in children consistently results in hyperglycemia, with blood sugar often in the vicinity of 200 mg. per hundred cubic centimeters. The blood sugar rises rapidly during spinal fluid replacement, reaches its peak within an hour and falls over a period of several hours. Hyperglycemia following encephalography bears no obvious relationship to the anesthetic used, the clinical condition or the age of the child or the amount of fluid withdrawn or of air injected. The physiologic explanation of the mechanism producing this hyperglycemia is still in a theoretical stage. There is no evidence that encephalographic hyperglycemia is reflected by an increase of dextrose in the cerebrospinal fluid sufficiently promptly to be demonstrated in samples taken during the operation.

HENSKE, Omaha.

FORMS OF FAMILIAL ATAXIA RESEMBLING MULTIPLE SCLEROSIS: A CLINICAL STUDY. G. W. HALL and R. P. MACKAY, Arch. Neurol. & Psychiat. **37**:19 (Jan.) 1937.

The clinical conception of multiple sclerosis probably includes several morbid entities. Hall and Mackay report two cases of Friedreich's ataxia and three cases of cerebellar ataxia in which the diagnosis was multiple sclerosis. The differential diagnosis is simplified by taking into account the family history, the progressiveness of the condition, the onset at an early age and the tendency to spare the pyramidal tract in cases of Friedreich's ataxia and cerebellar ataxia.

BEVERLY, Chicago.

PORENCEPHALY: DIAGNOSIS AND TREATMENT. C. A. PATTEN, F. C. GRANT and J. C. YASKIN, Arch. Neurol. & Psychiat. **37**:108 (Jan.) 1937.

Nine cases of porencephaly are reported. The diagnosis was confirmed by x-ray pictures in all cases and by operation in eight. In all but one case the cyst was in the left cerebral hemisphere. In all but one case there were abnormalities which had existed since early childhood, most commonly a lack of development. There were motor weakness and jacksonian convulsions in all cases. Some had hemianesthesia, hemianopia, atrophy of the optic nerve and generalized convulsions. Of the eight patients operated on, two died, three had complete relief from convulsions, and the others were markedly improved.

BEVERLY, Chicago.

CEREBROCEREBELLAR HEMIAGENESIS. H. A. PATTERSON and S. M. WEINGROW, Arch. Pediat. **54**:8 (Jan.) 1937.

The authors report a case of cerebrocerebellar hemiagenesis in a woman who died at the age of 39 years. Her progress was normal until she was 3 years of age, when she had convulsion with left hemiplegia resulting. The hemiplegia

remained throughout life, and convulsions continued to occur at monthly intervals. She never attended school, but it was claimed that during childhood her mentality was normal. One year before her death she had a mental age of 5½ years.

The pathologic examination revealed on the right side of the brain imperfect development throughout and destruction in some parts of the cerebral hemisphere, midbrain, pons and their adjacent structures. The cerebellar hemisphere, medulla oblongata and medulla spinalis of the left side were also underdeveloped. There was agenesis of the pituitary body.

ORR, Buffalo.

MENINGITIS DUE TO ORGANISMS BELONGING TO THE SALMONELLA GROUP. J. H. BAHRENBURG and E. E. ECKER, J. Infect. Dis. **60**:81 (Jan.-Feb.) 1937.

These authors describe meningitis due to an organism of the Salmonella group, classified under Salmonella Schottmülleri. They state that the classification of an organism cannot be depended on to establish its identity as a member of this group and that the agglutinin absorption test is the final arbiter of identification. It was used in only four of the thirty-four cases that have been previously reported.

TOOMEY, Cleveland.

SNAKE VENOM (MOCCASIN) IN THE TREATMENT OF EPILEPSY. I. FINKELMAN, J. Lab. & Clin. Med. **22**: 572 (March) 1937.

Eight epileptic patients were treated with snake venom for nine weeks. During this period convulsive attacks were more frequent than they were when the same patients were given phenobarbital or when they were given no treatment at all. It was concluded that the venom predisposes to convulsive attacks.

MCMURRAY, Galveston, Texas.

INFLUENZAL MENINGITIS. N. SILVERTHORNE, D. T. FRASER and C. E. SNELLING, J. Pediat. **10**:228 (Feb.) 1937.

From 1919 to 1929, seventy patients with influenzal meningitis were treated at the Hospital for Sick Children, Toronto. They were not treated with specific serum. The mortality rate was 98 per cent. From 1929 to 1936, thirty-six patients were seen and treated with specific serum. Of these, ten recovered—a mortality rate of 72 per cent. Anti-influenza horse serum (Fothergill) was given intravenously. Fresh human complement was given with horse serum, in the proportion of 7:3, intrathecally daily until the cerebrospinal fluid became sterile. In addition, the patients were given continuously intravenous injections of a mixture of two parts of 5 per cent dextrose and one part of physiologic solution of sodium chloride. Two successive patients, both of whom recovered, were treated with anti-influenza horse serum obtained by immunizing horses with bacterial strains from the cerebrospinal fluid of infants and children with influenzal meningitis and preserved in a dry state under vacuum in second, third and fourth subcultures. These same strains were used to immunize guinea-pigs. The guinea-pig serum, which was found to be very bactericidal, was mixed with the horse serum and given intrathecally. Guinea-pig serum has been found to be a more effective source of compulement than fresh human serum. In one of the two successive patients mentioned the guinea-pig serum was also given intravenously. Recovery of the two patients treated with a guinea-pig serum warrants its further trial.

RAUH, Cincinnati.

EXTENSIVE PLEXIFORM NEUROMA OF NECK. H. W. MEYER, New York State J. Med. **37**:403 (Feb. 15) 1937.

A large tumor of this type, which developed under an extensive pigmented nevus of the neck, is reported in a child of 5 years. Uneventful recovery followed radical extirpation.

AIKMAN, Rochester, N. Y.

STREPTOCOCCUS MENINGITIS. F. COONLEY, New York State J. Med. **37**: 573 (March 15) 1937.

Two recoveries from streptococcic meningitis are reported. One of these was in a girl 11 years of age. Meningitis followed acute mastoiditis and a pure growth of Streptococcus haemolyticus was obtained from the spinal fluid. All blood cultures were negative. Erysipelas streptococcus antitoxin was used both intramuscularly and intraspinally. In the second case, that of an adult, the streptococcus was not found in the spinal fluid.

AIKMAN, Rochester, N. Y.

THERAPEUTIC ACTION OF P-AMINOBENZENESULPHONAMIDE IN MENINGOCOCCAL INFECTION OF MICE. H. PROOM, Lancet **1**:16 (Jan. 2) 1937.

Proom found that oral administration of p-aminobenzenesulfonamide prevents septicemia and death in mice infected with meningococci. In established cases of meningococcic meningitis in man the conditions may not be comparable with those following intraperitoneal injection of a culture into mice. However, both the results of the experiments in mice and those obtained with the cerebrospinal fluid in rabbits suggest a clinical trial of this drug even when meningeal involvement has already occurred.

LANGMANN, New York.

MIXED MENINGOCOCCAL AND STREPTOCOCCAL MENINGITIS. A. A. CUNNINGHAM, Lancet **1**:198 (Jan. 23) 1937.

An 11 month old boy was first admitted to a hospital with follicular tonsillitis and left otitis media. About a month later he was readmitted with meningococcic meningitis as well as a recurrence of the otitis media and mastoiditis. At operation the dura mater was incised. This invasion may have been the path of secondary infection, but it is quite likely that the streptococci reached the meninges by direct extension from the ear.

If there is a mixed meningeal infection the usual antimeningococcic therapy must be combined with immediate operation on the infected mastoid, but unless there is clinical evidence of an intracranial abscess the membranes of the brain should not be opened.

LANGMANN, New York.

ACUTE HEMORRHAGIC PACHYMENINGITIS OF INFANCY. A. SECRÉTAN, Arch. de méd. d. enf. **40**:35 (Jan.) 1937.

An infant boy was in good health up to the the age of 3 months. At this time he was admitted to a hospital for a dyspeptic disturbance with diarrhea but without fever or vomiting. He remained for six weeks. No abnormalities other than the symptoms noted were found. Several months later the mother noted a rapidly increasing growth of the cranium, which after a month was accompanied with violent general convulsions.

On second admission, the patient was completely unconscious, with a temperature of 35.4 C. (95.7 F.) and a pulse rate of 140. The fronto-occipital perimeter was 40 cm., and the fontanelle was tense and hard. There were horizontal nystagmus, Chvostek's sign and exaggerated knee reflexes. Puncture of the lateral ventricle released fluid strongly tinged with blood. Two cubic centimeters of 10 per cent methenamine solution was introduced at this point and a moderate dose of phenobarbital given by rectum. Convulsions followed in spite of the sedative and were entirely uncontrollable up to the time of death on the following day.

Autopsy showed a very thick dura and beneath this a fresh effusion of blood. The brain was edematous, and the ventricles were greatly dilated with bloody cerebrospinal fluid. The Wassermann reaction was negative. The microscopic diagnosis returned from the pathologic institute of the University of Berne was: chronic fibrous and hemorrhagic pachymeningitis.

The special features in this case were the entire absence of any known etiologic factor and the apoplectiform ictus after an evolution the duration of which could not be fixed definitely but which was confirmed by the postmortem study.

AMESSE, Denver.

SYNDROME OF DIFFUSE INTRAPROTUBERENTIAL GLIO-EPITHELIOMA. A. M. ABRIL and H. FERNÁNDEZ DE CASTRO, Arch. de med. inf. **6:** 58 (March) 1937.

The following symptoms, confirmed by autopsy, constituted the syndrome: on the left side of the face, facial paralysis, paralysis of the oculomotor nerve, paralysis of the masseter muscle and absence of the corneal reflex; on the right side of the body, hemiplegia with early appearance of the Babinski sign and thermo-analgesic dissociation with suppression of the vibration sense. The lateral eye movements were paralyzed.

SANFORD, Chicago.

ACUTE POSTINFECTIOUS MENINGO-ENCEPHALITIS. N. CARRARA, Lattante **8:**13 (Jan.) 1937.

Two cases are reported, one of a boy aged 7 months in whom encephalitis appeared on the eleventh day after vaccination, and the other of a boy aged 15 months with bronchopneumonia. The former child recovered with some residual paralysis of the third cranial nerve on the right side; the latter child died. Carrara discusses the difficulties of diagnosis of parainfectious and postinfectious encephalitis.

HIGGINS, Boston.

MYELORADICULAR NEURITIS FOLLOWING INGESTION OF ATABRINE (A DERIVATIVE OF ACRIDINE). P. VALENTINI, Pediatria **45:**51 (Jan.) 1937.

Valentini describes myeloradicular neuritis in a 6 year old child affected with malaria, in whom this grave syndrome appeared after it had been treated with atabrine (a derivative of acridine) in a dosage corresponding to that for an adult. He mentions that Moschini reported a similar case in a child 2 years old. The syndrome is featured by flaccid paralysis of the muscles of the trunk and of the extremities, especially the lower ones. The cranial nerves are not always involved. The presence of aphonia in the case reported was due to a disturbance of the vagus nerve. Partial paralysis of the diaphragm was noticed, which was accompanied by vomiting; no sensory disturbance was elicited.

Valentini digressing asks himself: Where is the lesion? Is the nerve affected from the root to the muscle, or are the medullary centers involved? Closing Dr. Valentini points to the usefulness of the drug with cautious administration.

PALMIERI, Brooklyn.

MENINGITIS IN INFANCY. T. GOMES DE MORAES, Arch. de pediat., Rio de Janeiro **9:**135 (Feb.) 1937.

A review of the symptoms and treatment of meningococcic meningitis.

SANFORD, Chicago.

EPILEPSY AND HEREDITARY DISPOSITION: II. INCIDENCE OF EPILEPSY IN SIMILAR MONOZYGOTIC TWINS. K. CONRAD, Ztschr. f. d. ges. Neurol. u. Psychiat. **155:**254 (April) 1936.

As a supplement to his previous statistical studies on the incidence of epilepsy in the twins (similar or dissimilar) of patients with epilepsy Conrad presents

detailed case histories. The former studies established the rôle of the genetic factor in the pathogenesis of epilepsy. The case histories corroborate in a concrete way the conclusions based on the statistical data, which otherwise give an impression of unreality and of impractical generalization. These case studies also permit more accurate estimation of the relative rôles of genetic and environmental factors. The study of monozygotic twins, in whom the genetic factor is identical and therefore constant, affords an exceptional opportunity to study the interplay of exogenous and endogenous determinants. The chances that identical twins will present similar pictures because of exposure to precisely the same external nocuous agents are so small (1 : 240,000,000) that the objection to the use of this method of approach can be disregarded.

Eight cases of epilepsy in both of monozygotic twins in which the course of the disease was very similar are presented in detail, as well as brief résumés of ten reports from the literature. In most of the cases there was a history of mental disease, mental deficiency, epilepsy, alcoholism, migraine or psychopathic personality in close relatives. The grand mal seizures were often preceded by long periods during which absence of attacks, migrainous seizures and enuresis occurred. Sometimes a history of convulsions in childhood was obtained. The attacks usually began between the ages of 5 and 15, and, more rarely, up to about 26. In almost all cases the attacks appeared spontaneously and in reaction to no known external circumstances. Trauma to the head was often the result rather than the cause. A striking similarity in the attacks, aurae, interparoxysmal complaints, ages of onset and nature of the mental deterioration, is a strong argument for the endogenous nature of this disease. The attacks were at first infrequent. Later they came more often, and intellectual deterioration and dementia developed rapidly. This clinical picture is characteristic of the genetically determined form of epilepsy and can be proved for practical purposes (sterilization) even in the absence of other instances of epilepsy in the immediate family. Conrad disagrees with Mauz and others who laid emphasis on the necessity for the existence of changes in personality and the mental state as a criterion for the diagnosis of idiopathic epilepsy.

A case of twins with epilepsy and mental deficiency is reported by Conrad, with descriptions of five other cases from the literature. Four cases in which epilepsy and focal disorders occurred in both twins were found recorded in the literature. Conrad considers the epilepsy, mental deficiency and focal signs as symptomatic of a hereditary developmental defect of the brain. He suggests that in many cases so-called idiopathic epilepsy may belong in this group of dysplasias of the brain. In these instances the anatomic defects are neither gross nor located in significant parts of the brain.

Conrad also describes five of his own cases and five instances from the literature in which the clinical course and character of the convulsive state differed in identical twins. Also present were differences in endocrine status, degree of dementia and focal signs. The more mature of the twins, as well as the left-handed members, were usually the more seriously ill. In a few cases epileptic equivalents alone were present in one of the twins. A number of hypotheses are offered in explanation of the differences in epileptic twins: I. There may be a difference of cytoplasm, since recent evidence indicates that the cytoplasm plays a rôle in the transmission of hereditary characteristics. The milieu of the gene is apparently of some importance. 2. Exogenous factors which usually favor active participation of a particular gene in the development of the individual organism may be absent. 3. Exogenous factors may not affect both twins at the same time. Injuries to the head, syphilis, endocrine disorders and sunstroke and even different reactions to the attacks themselves are all mentioned. There is no doubt that differences in the vascular changes (spasms) accompanying the attacks may have bearing on the incidence and frequency of subsequent convulsive seizures. 4. Other inhibiting genes may be present, which prevent the appearance of a given characteristic. The author warns against the use of a single criterion by which to judge the presence

or absence of hereditary epilepsy. Individual differences exist, and the particular condition must be evaluated in the light of the course of the illness, the make-up of the subject and the family background.

SAVITSKY, New York. [ARCH. NEUROL. & PSYCHIAT.]

CONVULSIONS IN CHILDREN AND THEIR PREDISPOSING CAUSES. E. GERLEE and W. KIELJOTISOWNA, Pedjatrja polska **16**:303 (Sept.-Oct.) 1936.

Both authors discuss extensively predisposition to and causes of convulsions, reviewing domestic and foreign literature. In their discussion of epilepsy, they emphasize that in their experience males predominate. Syphilis as a cause is overemphasized. As to prevention and treatment, the bromides and phenobarbital stand in first place. The dietary treatment is still in the experimental stage in cases in which acetone plays a part in the prevention of convulsions. Pierre Marie introduced treatment with potassium boric tartrate, with which he obtained very satisfactory results.

KRUPINSKI, Chicago.

CHOLESTEROL CONTENT OF ORGANS IN LEAD MENINGITIS. T. YOSHINARE, Acta pædiat. japon. **43**:35 (Jan.) 1937.

Yoshinare reports a great increase of cholesterol in the liver, spleen and kidneys in infants dying of lead meningitis as compared with that found in persons with lead poisoning without symptoms of encephalopathy. In chronic lead poisoning produced in rabbits by repeated injections of lead salt the cholesterol content of these organs is also increased, but in animals fed a diet to which lead salts have been added the rise in blood cholesterol is not as high as in those poisoned by parenteral administration of lead. In acute poisoning, no consistent findings are obtained.

KATO, Chicago.

CHANGES IN THE BIOLOGIC PROPERTIES OF THE CEREBROSPINAL FLUID IN EPILEPTIC PATIENTS. L. PAPADATO, Acta med. Scandinav. **91**:306, 1937.

Normal cerebrospinal fluid acts as a constrictor on the blood vessels of frogs. The cerebrospinal fluid of epileptic patients gave negative results in 60 per cent, while that of patients with other diseases of the central nervous system (used as controls) gave negative results in only 33 per cent, of the frogs used.

The iridometric reaction of the isolated eyes of frogs was negative in 85 per cent of the fluids from the epileptic group but in only 58 per cent of those from the control group.

Hypoglycemia produced by an extract of adrenal cortex does not give rise to convulsions; convulsions are a symptom of insulin poisoning.

Papadato concludes that in a certain number of epileptic persons there is a deficiency of the posterior pituitary secretion and a hyperfunction of Langerhans' islets.

Diminution of the posterior pituitary-insulin coefficient is the essential in these patients.

KAJDI, Baltimore.

HYDROCEPHALUS IN TWINS AND THE STUDIES ON HEREDITY. J. A. STROINK, Nederl. tijdschr. v. geneesk. **81**:779 (Feb. 20) 1937.

This is a description of the delivery of twin girls, each with a hydrocephalus, a spina bifida and clubfeet. The placentas consisted of two amnions and two chorions. Though it is proved statistically (by Voûte) that in 30 per cent of the cases uniovular twins are born in two chorions, yet one cannot indicate in each separate case of dichorionic twins of the same sex which are uniovular and which are binovular, however great may be the resemblance between the two children. Therefore the twins described, notwithstanding their identical congenital abnormalities, could not have been used, had they lived, for research on heredity in uniovular twins. For such an investigation one needs twins that are uniovular without any doubt. This means that one can use only the monochorionic and mono-amniotic ones.

VAN CREVELD, Amsterdam, Netherlands.

Psychology and Psychiatry

RELATIONSHIP OF DECLINING INTELLIGENCE QUOTIENTS TO MALADJUSTMENTS OF SCHOOL CHILDREN. E. L. RICHARDS, Arch. Neurol. & Psychiat. **37**:817 (April) 1937.

Richards describes an extremely important group of children in whom a lowering of the intelligence quotient was the chief factor associated with the precipitation of school problems.

BEVERLY, Chicago.

EMENDATION OF THE ORGANIC ASPECTS OF THE PATHOLOGIC SPEECH OF MONGOLIANS. C. H. VOELKER, Arch. Pediat. **54**:172 (March) 1937.

The characteristic speech or utterances of a mongoloid child are due to the anatomic anomalies and physiologic malfunctions that are present. The causes can be classified as follows: (1) loss of acuity of hearing, (2) palatalization, (3) malocclusion, (4) imperfect dentition, (5) ataxic movements, (6) rhinal and nasopharyngeal obstruction, (7) poor respiratory control, (8) salivary hypersecretion and (9) an open mouth and a protruding tongue.

ORR, Buffalo.

RELATION OF THE EMOTIONAL ASPECT OF CHILDHOOD TO THE PRACTICE OF PEDIATRICS. J. C. SOLOMON, Arch. Pediat. **54**:218 (April) 1937.

The child has an impressionable mind, and physicians should be ever aware of the effects of the emotional attitudes of all persons with whom the child comes in contact. Workers in psychiatry, sociology and related fields have long recognized the importance of the attitude and behavior of each person who might influence the child in any way. There is no reason why pediatricians cannot be made at least to think along these lines.

ORR, Buffalo.

THE PROBLEM PARENT. M. GLEICH, Arch. Pediat. **54**:240 (April) 1937.

This is another paper on mental health and child guidance that offers nothing new.

ORR, Buffalo.

MEDICINE, THE LAW, AND JUVENILE DELINQUENCY. SMITH ELY JELLIFFE, J. Crim. Law & Criminol. **27**:503 (Nov.-Dec.) 1936.

Psychiatry is no longer a narrow study of the psychotic person. The psychiatrist is an observer of the conduct of the entire organism. There is a shift in the legal point of view from the punitive to the prophylactic. Science per se is interested in the relation of the organism to its environment, i. e., ecology, so that psychiatry is now taking more and more this point of view. The change dates to freudian psychology, which deals with understanding of the depths of personality. Delinquency represents something which can be found in all persons; social agencies modify this factor. With the development of the psychiatric point of view, agencies may be able to play an important part in the treatment of delinquency. The psychiatrist offers help to the law in determining the influence of the milieu in the formation of the superego. One can illustrate this by pointing to the Whittier Correctional School, near Los Angeles, where this point of view has been invoked.

SELLING, Detroit. [ARCH. NEUROL. & PSYCHIAT.]

DO PROBLEM CHILDREN BECOME DELINQUENTS AND CRIMINALS? NATHAN BODIN, J. Crim. Law & Criminol. **27**:545 (Nov.-Dec.) 1936.

Bodin reports a survey of 116 adult persons who from ten to fifteen years previously had been considered problem children in the schools of Berkeley, Calif. They were originally studied chiefly at the age of from 13 to 14, although in

some cases the conduct disorders presented themselves as early as 8 years of age. During the present survey the average age of these persons was from 22 to 23. The original mean intelligence quotient was 79. The girls had been arrested chiefly for sexual misconduct and the boys for various offenses. Of those who had been arrested 31.3 per cent were arrested for larceny and offenses against property, and most of the others, for "incorrigibility"; 54.5 per cent of the offenders had been arrested more than twice, and 26.6 per cent, more than five times; 92.5 per cent have since become delinquents and criminals, and 50.6 per cent had become delinquent in the preadolescent period. It is concluded that while the apparent result of reference to the Bureau of Research and Guidance is not good, the bureau in reality has not failed, for the following reasons: (1) It was not until eight years ago that modern methods of treatment were installed; (2) there was a large percentage of subnormal and feebleminded children in the group, and (3) the work of the bureau has been curtailed. Bodin suggests further research for determination of the factors involved.

SELLING, Detroit. [ARCH. NEUROL. & PSYCHIAT.]

A PSYCHIATRIST'S VIEW OF THE PROBLEM OF PREVENTION IN PEDIATRICS. J. S. PLANT, South. M. J. **30**:290 (March) 1937.

It is believed by many that development of "the third child attitude" among parents would constitute a stride in preventive pediatrics, as it would focus attention on the significant things, instead of "Johnny's spinach" or "baby's weight"—details of minor importance which are too much magnified.

The development of such an attitude, however, is difficult because of certain problems which arise: the responsibility put on the child, even before birth, that it be of a certain sex and resemble a certain relative and the demand that it fulfil the parents' dreams and ambitions; the distortion which comes of parents' love for their children—the problem not of weaning children from parents but of weaning parents from children; the difficulty of disentangling the threads of love and dependence as children cease to be dependent on their parents, and the difficulty of understanding that life is not a matter of solution of the problems of relationship but rather one of recognition of the problems.

From the psychiatrist's point of view, prevention in pediatrics is an exceedingly nebulous affair and is not solved by the "third child attitude," as statistics show that the third child is no better adjusted and presents just as many problems as his predecessors.

SCHLUTZ, Chicago.

THE PREVENTION OF NERVOUS AND MENTAL DISORDERS: SOME POSSIBILITIES AND LIMITATIONS. J. F. WILLIAMS, M. J. Australia **1**:387 (March 13); 419 (March 20) 1937.

The author first reviews the problem of inheritance of neuropathic disorders and concludes that their control by sterilization is so uncertain as to make the widespread application of this policy impracticable. Alcoholism plays an uncertain rôle in mental deficiency, and he feels it should frequently be regarded as a symptom rather than a cause. Statistics as to the increasing number of mentally deficient persons are somewhat misleading because many of the patients show a senile type of deficiency which is undoubtedly the result of increasing longevity.

In the second lecture the author deals more specifically with preventive measures and the importance of certain educational factors, such as sex education. Psychoanalysis if mixed with a fund of "practical common sense" may be a useful method of investigation. Nursery schools offer an excellent method of assisting in the socialization of children. He feels that freedom from anxiety resulting from improved social and economic conditions and the lessening of occupational hazards and monotony will do much to reduce the incidence of neuroses.

TENNEY, Madison, Wis.

DIFFICULTY IN BRINGING UP A CHILD IN THE PERIOD OF MATURITY. R. UZDANSKA, Zycie Dziecka **6**:7 (Jan.) 1937.

Uzdanska discusses the period of puberty and the dangers connected with this period of life. It is a period which presents a problem to parents and supervisors of children. If the child is misguided in this period, it may lead to prostitution, drunkenness, thievery and criminality of all sorts. One must know the psychology of children of this age and guide them through proper channels.

KRUPINSKI, Chicago.

CULTURE OF SEXUAL ETIQUETTE IN YOUTH. M. BENIELOWSKA, Zycie Dziecka **6**:16 (Jan.) 1937.

This subject has been a problem for ages. Little has been said about it until recently. An evolution regarding this matter is now taking place. Benielowska comes to the conclusion that sex etiquette must be taught properly and that the question is who should teach it and how and when.

KRUPINSKI, Chicago.

TIME AND ITS UTILIZATION TO THE BEST ADVANTAGE. W. MORO, Zycie Dziecka **6**:33 (Feb.) 1937.

Some claim that the company of parents and home are the proper surroundings for bringing up the child. However, it is not always possible to rear the child in such an environment. Nowadays schools, theaters, radios, sports and outdoor life call for proper utilization of time by the young.

This problem exists throughout the whole world. KRUPINSKI, Chicago.

Diseases of the Genito-Urinary Tract

GLOMERULAR NEPHRITIS. H. C. ARCHIBALD, Arch. Pediat. **54**:82 (Feb.) 1937.

Archibald presents an analysis of forty-three cases of nephritis. In twenty-nine the condition was diagnosed by the Addis test as acute glomerulonephritis, in four as chronic glomerulonephritis and in ten as chronic glomerulonephritis with nephrosis. Special emphasis is placed on the value of the Addis test as an aid to a more accurate diagnosis and prognosis of nephritis. ORR, Buffalo.

ENURESIS. M. F. CAMPBELL, Arch. Pediat. **54**:187 (April) 1937.

All children with enuresis should be subjected to a thorough urologic examination when the condition is resistant to intensive medical treatment or psychotherapy over a period of two or three months. Over 700 children with resistant enuresis were given a thorough urologic examination, and it was found that 60 per cent of them had abnormalities of the genito-urinary system which accounted for the enuresis. About 16 per cent had residual urine in their bladders. When no abnormalities of the genito-urinary tract exist, Campbell advises the continuance of medical treatment or of psychotherapy with the assurance that no destructive uropathy is in progress and that eventually the child will cease wetting.

ORR, Buffalo.

TREATMENT OF GONORRHEAL VULVOVAGINITIS WITH A SPECIAL GLUCOSE TABLET: A PRELIMINARY REPORT. A. A. LITTLE JR., J. Pediat. **10**:202 (Feb.) 1937.

It has been shown in vitro that vaginal bacteria are capable of converting dextrose into lactic acid and producing a hydrogen iron concentration as low as p_H 4.5. In order to produce this hydrogen ion concentration in the vaginal vault and inhibit the growth of the gonococcus in cases of vulvovaginitis, a tablet composed of a carbohydrate which has been partially modified by oxidation and

hydrolysis, boric acid and a small amount of arsenic was used as a suppository. A tablet was inserted morning and evening and placed as far in the vaginal vault as possible. No other therapy except cleansing douches was used. Of thirty-nine patients treated, nineteen were discharged as cured. The remainder were still under treatment at the date of publication. The average number of days for a cure was 98.5 as opposed to the 249.8 days required previously. The author feels that better results would have been obtained if this treatment had been combined with the hormone treatment but, because of lack of funds, he had been unable to carry out the combined treatment.

RAUH, Cincinnati.

EXSTROPHY OF THE BLADDER. W. E. LADD and T. H. LANMAN, New England J. Med. **216**:637 (April 15) 1937.

In this series of thirty ureterosigmoidostomies there were no fatalities, and in every patient a good functional result was obtained.

The authors believe that the oblique submuscularis transplantation of the ureter, with its possible valve action, plus an unobstructed and straight flow of urine through the ureter into the bowel, is of far more importance in preventing infection of the urinary tract than is commonly emphasized.

They advocate a three stage operation, with transplantation of the right ureter first, and of the left from two to four weeks later; they would use the transperitoneal approach for the ureterosigmoidostomies, leaving no catheter or guides but having the proximal end of the ureter opened widely by a longitudinal split; they state that there should be no drainage of the peritoneal cavity and that the bladder should be removed as soon as is practicable after the ureteral transplantations. The age of the patient should be between 3 and 5 years.

GENGENBACH, Denver.

URETERAL PAIN AS DETERMINED BY FARADIC STIMULATION IN MAN. N. F. OCKERBLAD and H. E. CARLSON, Proc. Soc. Exper. Biol. & Med. **36**:35 (Feb.) 1937.

A ureteral catheter electrode was introduced into the ureter, and stimulation was made at various levels up the ureter. Eight patients were studied by this method with the following findings: In the lower 1 to 2 cm. of the ureter the pain was referred suprapubically, being almost in the midline and extending upward about 4 cm. Pain in the perineum occurred in some cases. Five centimeters from the urethral orifice the pain was higher and lateral to the midline; it was felt below the iliac crest and somewhat medial to McBurney's point. In some cases pain occurred in the inner or outer aspect of the thigh of the leg. At 10 to 20 cm., the pain was referred to practically the same abdominal areas as the lower levels, but pain on the inside of the leg, often extending to the toes, was the rule. At 25 cm. the pain occurred over the anterior portion of the iliac crests and anterior iliac spines. When the interior of the kidney was stimulated, the pain was always referred to the back. In one case of chronic hydro-ureter and nephrosis, no pain occurred on stimulation with the electrode.

HANSEN, Minneapolis.

THE CURVE OF PHENOLSULPHONPHTHALEIN ELIMINATION IN UNILATERAL KIDNEY DISEASE. E. C. SHAW and J. A. MCKENZIE, South. M. J. **30**: 61 (Jan.) 1937.

The curve of phenolsulfonphthalein elimination, with its graphic demonstration of the interrelationship of the percentages of dye eliminated in a series of fifteen minute periods, is the most sensitive of all practical renal function tests. Under normal conditions the curve is characterized by an elimination of phenolsulfonphthalein in the first fifteen minute period approximately equal to the total of the percentages eliminated in the remaining seven periods, and the dye in each specimen after the first is approximately half of that in the preceding specimen. The earliest departure from normal renal efficiency is indicated by a decrease in the dye

eliminated in the first fifteen minute specimen, with a corresponding increase in the later specimens. As a renal failure advances, the peak of elimination shifts from the first to the second period, and in severe failure, to the third period.

In unilateral renal disease, the damaged organ in some instances eliminates a reduced portion of the dye in a normal manner, while in others with higher total output it shows delayed elimination with the peak occurring after all dye has disappeared from the blood stream. Inflammatory processes seem to delay elimination of the dye, while impairment of the circulation and destruction of tissue reduce the total output. A study of the elimination curve may give not only an index of a kidney's efficiency but information as to the type and location of the pathologic processes.

SCHLUTZ, Chicago.

MACROGENITOSOMIA PRAECOX (PELLIZZI'S SYNDROME). E. SORREL and SORREL-DÉJERINE, Rev. neurol. **63**:206 (Feb.) 1935.

A child of 4 years was brought in for treatment of supposed hypospadias. Careful examination proved the genitalia to be female. Laparotomy showed ovaries and a uterus. No displacement of the kidneys could be made out by x-ray pictures. Although the child's size was that of a 9 year old girl with a roentgenographic bone age of between 16 and 18 years, her dentition was that of a child of 4. There was extraordinary growth of hair about the genitals but not elsewhere. The optic disks were normal, and there were no other signs of intracranial pressure.

The authors consider this a typical case of the epiphysial syndrome as described by Pellizzi, with the exciting cause a pineal tumor. Since the general condition of the child is excellent, nothing further has been done in treatment or in investigation of the etiology.

DAFFINEE, Boston.

VESICAL LITHIASIS. A. NOGUEIRA, Arch. de pediat., Rio de Janeiro **9**:89 (Jan.) 1937.

The symptoms are pain and frequency of urination. The masses can be seen in the roentgenogram and can be removed surgically. Three cases in children under 3 years of age are discussed.

SANFORD, Chicago.

TREATMENT OF GONORRHEAL VULVOVAGINITIS IN INFANTS WITH ESTROGEN. H. WILDE and B. WOLF, Med. Klin. **33**:122 (Jan. 22) 1937.

While some reports regarding the treatment of gonorrheal vulvovaginitis with estrogen are very favorable, others are very discouraging, partly because of the by-effects (abdominal cramps, enlargement of the breast, uterine bleeding and masturbation). Because of the by-effects and because of recurrences treatment with estrogen in conjunction with local treatment resulted unsatisfactorily in one case of vaginal gonorrhea, five of vaginal and urethral gonorrhea and one of vaginal, urethral and rectal gonorrhea. Estrogen (folliculin-menformon) was employed according to the method of Hohorst (first day 10,000 units intramuscularly; on subsequent days 1,000 units four times a day orally until smears were negative, then 1,000 units three times a day orally for three weeks). Hypertrophy of the breast was observed in all cases. Two patients masturbated. Wilde and Wolf think that the endocrine system may be unfavorably influenced over an extended period. The future will reveal whether these disturbances will become manifest at the time of sexual maturity.

SIEMSEN, Chicago.

OCCURRENCE OF CITRIC ACID IN RENAL AND VESICAL CALCULI OF RATS. J. VERKOREN, Nederl. tijdschr. v. geneesk. **81**:672 (Feb. 13) 1937.

In renal and vesical calculi from rats fed on a full diet to which calcium carbonate was added in the proportion of 3 per cent, citric acid was found in

considerable quantities. Some of the calculi consisted almost wholly of calcium citrate. In connection with these findings investigations are being carried out for calcium citrate in calculi of the human urinary tract.

VAN CREVELD, Amsterdam, Netherlands.

Diseases of the Ductless Glands; Endocrinology

ADRENAL NEUROBLASTOMA IN CHILDREN—WITH REPORT OF TWO CASES. L. J. RHEA and C. I. MEAD, J. Pediat. **10**:37 (Jan.) 1937.

The authors briefly review the literature and report two cases of neuroblastoma. They classify the tumor in the first case as Hutchinson's completely undifferentiated sympathicoblastoma (Bailey and Cushing) or neuroblastoma (Robertson). This tumor was unique in that it was Hutchinson's type of tumor with a primary bilateral adrenal tumor. It occurred in a 5 year old girl, in whom high fever developed, with vomiting and severe pain in the knee. Two months later prominence of both eyes was noted. Later enlargement of the head and hemorrhage of the eyelids developed. Examination four months after the onset showed a large head, all suture lines open and separated, with soft tissue bulging through, bilateral proptosis and hemorrhage into the right eyelid. The abdomen was protuberant with enlargement of the liver and tenderness in the upper half. In the midline a hard rounded fixed mass was felt, the size of an orange. Six months after the onset death occurred.

Autopsy revealed a neuroblastoma arising as a bilateral adrenal tumor with metastases in all of the bones and lymph glands but not in the liver and lungs.

The second patient was a 3 year old white girl, who complained of abdominal pain, intermittent, never severe or well localized. There was some elevation of temperature. A mass was palpable in the right upper quadrant of the abdomen and thought to be a kidney. The liver gradually increased in size, and anemia developed. Pyelograms showed the right kidney displaced downward and outward. Exploratory laparotomy was done about three months after the onset, and a large mass of enlarged glands extending into the right upper region of the abdomen was connected with a large retroperitoneal mass located in the region of the adrenal gland. Biopsy of a lymph node was done, and the histologic diagnosis was metastasis of a neuroblastoma primary in the adrenal. Eight months after the onset the patient died. No postmortem examination was made. The authors classified this tumor as a Pepper type of neuroblastoma because of the lack of roentgen evidence of bony involvement, the enlargement of the liver and the tumor in the region of the right adrenal gland.

RAUH, Cincinnati.

LAURENCE-BIEDL SYNDROME: CASE REPORT. J. M. ARENA, J. Pediat. **10**: 62 (Jan.) 1937.

The case of a 12 year old white girl is cited. The outstanding features were obesity of the Fröhlich type, poor vision, mental retardation, syndactylism and polydactylism. The systolic blood pressure was elevated. The ocular fundi showed discrete scattered splotches of pigment, dendritic in shape, and beginning optic atrophy. The various hypotheses concerning the pathogenesis of this syndrome are given, and the author believes the most probable one to be that it represents a hereditary developmental defect involving two or more genes bearing unit characters that may carry simple recessives but not simple dominants.

RAUH, Cincinnati.

IV. THE TREATMENT WITH GONADOTROPIC HORMONE (ANTERIOR PITUITARY-LIKE) OF NONADIPOSE BOYS SHOWING GENITAL DYSTROPHY. G. B. DORFF, J. Pediat. **10**:517 (April) 1937.

Two preadolescent nonadipose boys with genital dystrophy and hypothyroidism were successfully treated with the gonadotropic hormone from the urine of preg-

nant women and with desiccated thyroid. Desiccated thyroid alone in such cases has a stimulating effect on the gonads. The hormone has a more stimulating, more rapid effect on the gonads. A gonadotropic substance extracted from the anterior pituitary gland was used for a short period and showed some gonadal stimulative properties. A gonadotropic extract from placenta was also given for a time to one boy, but it showed no stimulative effects on the gonads.

It is Dorff's opinion that the greater number of nonadipose boys with genital dystrophy, as well as of adipose boys with genital dystrophy, usually show an endocrinologic basis for their genital disturbance, and it is advisable to institute treatment with glandular preparations in all cases of genital dystrophy with the exception of cases of normally developed aberrant testicles. After such therapy has been administered without results, surgical operation for the correction of a likely mechanical obstruction should be considered. RAUH, Cincinnati.

SOME SURGICAL PROBLEMS OF THE THYROID GLAND. N. F. HICKEN, Nebraska M. J. **22:** 8 (Jan.) 1937.

In children the onset of hyperthyroidism is sudden and its course rapid, with devastating effects. The cardiac reserve is soon depleted by an extremely rapid pulse; physical exhaustion and collapse are brought about by pronounced emotional instability, particularly when this is combined with heightened metabolic activity. Lack of cooperation and emotional activities render conservative medical treatment ineffective. Early diagnosis and prompt surgical intervention are necessary. Sedation is ineffective. Medical treatment does not materially decrease the tachycardia. General anesthetics are not well tolerated, and tribromethanol in amylene hydrate, with the local use of 1 per cent procaine hydrochloride, is recommended. Postoperative reactions are severe. Common errors are: operating before the child is fully prepared, and removal of the entire gland at one time. Multiple stage operations are preferable, following a trial ligation of the thyroid vessels. It is important that the entire gland is not removed, in order that cretinoid stigmas may be avoided. HAMILTON, Omaha.

HYPERTHYROIDISM IN CHILDREN. G. E. BEILBY and J. C. MCCLINTOCK, New York State J. Med. **37:** 563 (March 15) 1937.

Two cases of exophthalmic goiter are reported. One patient was operated on at 2 years and 9 months and again a year later. She is now 8 years of age and has had no return of symptoms. The other patient, a girl of 4 years and 4 months, also made a good recovery after operation. Early surgical intervention is necessary if detrimental physical changes are to be avoided. The subject receives too little consideration in textbooks. AIKMAN, Rochester, N. Y.

EXPERIENCES WITH LIBERAL CARBOHYDRATE DIETS IN DIABETIC CHILDREN. H. L. DWYER, South. M. J. **30:** 74 (Jan.) 1937.

Dwyer's experience with diabetic children on a diet which closely approximates that of normal children in the partition of carbohydrates and fats leads him to believe that the diet has many advantages over diets low in carbohydrates and high in fat. Coma and hypoglycemia are less frequent. The blood sugar tends to be more stable, and less insulin is needed when the carbohydrate allowance is increased to 50 per cent of the total calories. The patient is more cooperative, infractions of the dietary regimen are less common and increases in height and weight are noteworthy. SCHLUTZ, Chicago.

PROTAMINE INSULIN IN THE TREATMENT OF DIABETES OF INFANCY. R. PÉREZ DE LOS REYES, H. DE LA TORRE and J. MANUEL SUÁREZ, Arch. de med. inf. **6:** 5 (March) 1937.

Three diabetic children remained sugar-free with three or four daily doses of from 95 to 118 mg. of current insulin per hundred cubic centimeters of blood in

the day time; at daybreak, on a fasting stomach their glycemia rose to 210 mg. With equal or smaller doses of protamine insulin their fasting glycemia fell to from 127 to 168 mg., with disappearance of their morning oscillations.

SANFORD, Chicago.

THE KERATINIZATION TEST IN CASTRATED FEMALE RATS FOLLOWING INJECTIONS OF ESTROGEN. A. ARTHUS and M. J. MALAN, Compt. rend. Soc. de biol. **121**: 196, 1936.

Castrated female rats which, naturally, became anestrous were given estrogen subcutaneously. In from five to six days keratinization of the vaginal mucosa developed, with a normal estral cycle.

Likewise, normal copulation with the male took place. There was no difference between artificially produced and physiologic cycles.

WAHL, Cleveland.

DIABETES MELLITUS IN CHILDHOOD. G. FRONTALI, Riv. di clin. pediat. **35**: 87 (Jan.) 1937.

In the pediatric clinic of Padua there have been 8 children with diabetes among the last 2,500 patients. Seven are still alive and doing very well. One had pulmonary tuberculosis with a cavity; pneumothorax was carried out; the child did very well under treatment as regards both the diabetes and the tuberculosis. Another child suffered a hypoglycemic reaction following the use of insulin; this persisted after the giving of sugar; however, it was noted that the blood calcium was low, indicating concomitant tetany. Frontali maintains that insulin for diabetes should be furnished to poor people gratuitously.

HIGGINS, Boston.

A CASE OF DIABETES INSIPIDUS. E. FILGUEIRAS and H. DE CHRISTO ALVES, J. de pediat., Rio de Janeiro **4**:2 (Jan.) 1937.

The child was 4 years of age and of Portuguese parentage. He presented the classic symptoms of polydipsia and polyuria (5 liters of urine per day). There was no sugar in the urine, and the blood sugar was normal. The child was slightly subnormal mentally. By the injection of a solution of posterior pituitary the authors were able to keep the daily excretion of urine to 2 liters.

SANFORD, Chicago.

CONGENITAL GOITER. L. TREPLIN, Deutsche Ztschr. f. Chir. **248**:174, 1936.

Treplin reports two cases occurring in sisters in Hamburg, where goiter is uncommon. Both parents were born in that city, and there was no family history of goiter. The first child was seen at the age of 6 weeks. She had been born with a "thick neck," which had gradually increased in size. Attacks of suffocation had occurred, so surgical intervention was carried out. The tumor consisted of two lobes, the right twice as large as the left. The right lobe was completely resected in one operation, and the left was partially resected a short time later. The histologic diagnosis was papillary adenoma. When the child was 13 years old, a tumor of the isthmus developed, measuring 4 by 5 by 7 cm. The basal metabolic rate was plus 10. There were no clinical symptoms of hyperthyroidism. The tumor was removed surgically, and the histologic diagnosis was struma nodosa parenchymatosa. No colloid was present. One-half year later typical myxedema developed. The symptoms of this condition were completely relieved by administration of thyroid. A sister 2 years older had also been born with a "thick neck." There was no tracheal compression, but when she was 10 years old it was necessary to operate because of a rather large tumor. The histologic diagnosis was colloid-free goiter.

GLASER, Rochester, N. Y.

TREATMENT OF DIABETES MELLITUS IN CHILDREN. E. MÜLLER, Med. Klin. **33**: 113 (Jan. 22) 1937.

A diet liberal in carbohydrate (from 150 to 300 Gm. daily) or a general diet is desirable for proper growth. Sufficient insulin should be given to avoid ketosis, which lowers the tolerance to carbohydrate and may lead to coma. Hyperglycemia has not proved to be harmful. It may be beneficial in that it obviates hypoglycemic reactions and diminishes hunger. The general well being of the diabetic child should be the guiding principle in treatment.

SIEMSEN, Chicago.

EXPERIENCES WITH PROTAMINE-INSULIN (LEO-RETARD) IN JUVENILE DIABETES. L. FREY, Med. Klin. **33**:300 (Feb. 26) 1937.

A study of four cases yielded the following results: 1. The blood sugar curve is less fluctuant with 2 doses of protamine insulin (smaller total dose) than with 3 doses of ordinary insulin. 2. Hypoglycemic reactions are more common with ordinary than with protamine insulin in similar dosage. 3. Patients with total diabetes can be controlled with 2 doses of protamine insulin daily. 4. Injections of protamine insulin were no more painful than were those of ordinary insulin, and reactions were not observed.

SIEMSEN, Chicago.

TREATMENT OF DIABETIC COMA IN CHILDHOOD. R. PRIESEL, Med. Klin. **33**: 393 (March 19) 1937.

Severe diabetic coma (blood sugar, 1,314 mg. per hundred cubic centimeters) in an untreated boy 11 years old is reported. Recovery followed the use of 280 units of insulin—initial dose, 100 units. In such a case the giving of insulin must be continued (not interrupted during the night) at intervals of from one to three hours until recovery from the coma is complete. When the blood sugar becomes normal or glycosuria ceases, sugar must be given along with insulin. Early in the treatment of coma, administration of dextrose is not only superfluous but may be detrimental in that it increases resistance or refractoriness to insulin. Adequate administration of fluid is important in overcoming dehydration and renal insufficiency, which may at times lead to disappearance of sugar from the urine.

SIEMSEN, Chicago.

Diseases of Muscles, Bones, Joints and Lymph Glands

PLATYSPONDYLY. J. BUCHMAN, Arch. Surg. **34**:23 (Jan.) 1937.

Platyspondyly is a congenital anomaly consisting essentially of a widening of the vertebral body. Buchman discusses the pathogenesis, the clinical and roentgenographic appearances and the differential diagnosis of this condition. Its genesis may be attributed to a failure or a delay in the fusion of the lateral halves of the vertebral anlage at its membranous stage of embryonic development. There are roentgenographic destructive changes in the vertebrae and in the intervertebral disks. The importance of recognizing this condition is to distinguish it from other more frequent and clinically more significant abnormalities.

KAISER, Rochester, N. Y.

PULMONARY HYPERTROPHIC OSTEO-ARTHROPATHY OF INFANTS AND CHILDREN. R. L. J. KENNEDY, Proc. Staff Meet., Mayo Clin. **12**:71 (Feb. 3) 1937.

A boy 7½ months of age, starting at 3 weeks of age, had a series of pyrogenic infections, terminating in a multilocular pulmonary abscess. Clubbed digits associated with generalized osteo-arthropathy were noted. The presence of this condition at such an early age proves that it may develop rapidly after the onset of the primary disease.

MILLER, South Bend, Ind.

ACUTE OSTEOMYELITIS IN CHILDHOOD. H. E. CONWELL and J. D. SHERRILL, South. M. J. **30**:171 (Feb.) 1937.

Acute osteomyelitis in older children differs from that in infants under 2 years —the latter is due to Streptococcus haemolyticus, and if the child survives the acute attack the recovery is rapid and complete; the former is generally due to Staphylococcus aureus and if not diagnosed and treated in its early stage becomes chronic and persists with frequent recurrences—often throughout life.

The danger lies in delay of diagnosis and treatment, thereby allowing destructive inflammation of bone, which results in permanent disabilities and even death.

The disease rarely occurs after the epiphyses are completely fused with the shaft of the bone.

Infection is carried by the blood and is contracted through the mouth—by way of the tonsils, sinuses or middle ear—and through skin surfaces—impetigo, boils and the like.

The patient, apparently well, contracts sore throat or has a local infection of the skin and probably has received an injury sufficient to wrench or twist one of the epiphyses, causing minute hemorrhage and thus forming a good culture medium for micro-organisms. In a few days, pain and tenderness develop in the joint, accompanied by fever; the pulse is rapid, the tongue dry, and there is definite leukocytosis, with the picture of septicemia. Early roentgenographic findings are always negative. Blood transfusions are often indicated—sometimes even before operation. Treatment with roentgen rays of high voltage, while of no benefit in bone involvement, is successful where there is a large area of slowly healing granulation tissue.

SCHLUTZ, Chicago.

SCHÜLLER-CHRISTIAN'S DISEASE. F. R. B. ATKINSON, Brit. J. Child. Dis. **34**:28 (Jan.-March) 1937.

Moreau believes that in addition to the triad of defects in the bones, exophthalmos and diabetes insipidus a fourth symptom should be added, namely, arrest of development ending in dwarfism.

Synonyms of this disease include xanthomatosis, lipoid granulomatosis, lipoid histiocytosis, lipoidosis and hypophysial reticulo-endotheliosis.

Hand in 1893 published the first certain case of the disease but did not recognize that he was dealing with a new clinical entity.

Atkinson has collected one hundred and three instances from the literature and discusses briefly the symptomatology and pathology of the disease and theories as to its possible pathogenesis. The view as to its etiology that is now most popular is that it is a disorder of the lipoid metabolism, especially the production of hypercholesteremia.

The male sex is much more often affected than the female, and in the largest number of cases the condition occurs between the ages of 2 and 8 years.

Some patients slowly recover without any treatment, the deficiencies in the bones filling in. In others the gaps in the bones are never quite filled up, but otherwise the patient is in good health. Others die of cachexia or intercurrent disease.

Removal of fat from the diet and roentgen therapy of the affected regions seem to give the most promising results in the way of treatment.

LANGMANN, New York.

CHRONIC ARTHRITIS (FOR DIAGNOSIS). SHEILA M. FRANKLIN, Proc. Roy. Soc. Med. **30**:710 (April) 1937.

A case of chronic arthritis in a girl of 11½ years is reported. For four months the knees and ankles had been swollen and painful. The knees were similarly affected two years previously, the attack lasting about six weeks. She complained

infrequently of aching in swollen joints. The temperature ranged between 97 and 100 F. On physical examination the lymphatic glands in both axillae and in the right groin were noted to be slightly enlarged. The deep inguinal glands were also palpable but not grossly enlarged. The Mantoux reaction to a 1 : 1,000 solution of tuberculin was positive. Microscopic examination of a gland from the right axilla showed caseation and typical giant cell systems. A roentgenogram of the lungs showed large glands at the roots and some calcified areas suggesting old hilar tuberculosis. Fluid from the right knee joint gave a sterile culture; a guinea-pig was inoculated with the fluid, and no evidence of tuberculosis was found at the end of six weeks. The results of other investigations are given in the report.

WILLIAMSON, New Orleans.

ABSCESS OF THE APOPHYSIS OF THE OS CALCIS IN A CHILD. R. GRASHEY, Röntgenpraxis **9**:51 (Jan.) 1937.

A 6 year old girl complained of increasing pain in the right heel during several weeks but was otherwise well. A fistula appeared at the site of the pain. Roentgen examination revealed fragmentation of the apophysis of the os calcis. The infected bone was removed, and the child made an uneventful recovery. Histologic examination of the material removed resulted in a diagnosis of chronic nonspecific osteomyelitis.

MCCUNE, New York.

THREE FORMS OF SYSTEMIC DISEASES OF THE MYELOID TISSUE IN CHILDREN. S. TAMURA, Acta pædiat. japon. **43**:445 (March) 1937.

As examples of systemic diseases of the myeloid tissue Tamura reports, first, a case of myeloid chloroma occurring in a 4 year old child who showed peripheral myeloblastemia; second, a case of multiple myeloma (myeloblastoma) in a 4 year old boy with no leukemic changes in the blood, and, third, a case of myeloblastic sarcoma in a 2½ year old infant. The histologic examination of tissues in these cases demonstrated their myeloid origin.

KATO, Chicago.

Skin Diseases; Allergy

ECZEMA IN INFANCY AND CHILDHOOD. H. GOODMAN and M. BURR, Arch. Pediat. **54**:88 (Feb.) 1937.

Several menus for elimination test diets are submitted.

ORR, Buffalo.

MUTUAL ABSORPTION TESTS WITH RELATED FOODS. H. S. BALDWIN and M. I. BENEDICT, J. Allergy **8**:120 (Jan.) 1937.

A series of experiments were done on a group of persons sensitive to foods, to show that related foods have common excitants. Celery, carrots, parsnip and parsley, belonging to the Umbelliferae family, were shown to contain a common excitant. The same was true of apple, quince and pear, belonging to the Pomaceae family.

The authors feel that while the experiments show a definite relationship existing between foods, they also indicate that more work needs to be done in purifying the materials used for food testing.

HOYER, Cincinnati.

LIPIDS OF THE BLOOD PLASMA IN HAY FEVER AND ASTHMA. S. S. BULLEN and W. R. BLOOR, J. Allergy **8**:155 (Jan.) 1937.

The blood lipids of fourteen patients who had hay fever or who had had asthma and eczema from the time of infancy were compared with those of twelve patients

who were considered normal. The age in both groups ranged from 24 to 60 years. The studies were made on blood taken three hours after breakfast. Conclusions: "So far as these results show, there is no definite difference in the degree of unsaturation of the plasma fatty acids between adults suffering from asthma, and hay fever and those who do not have these diseases.

"Therefore it could not be expected that the feeding of unsaturated fats would be of therapeutic value in asthma and hay fever."

HOYER, Cincinnati.

STATUS ASTHMATICUS: REPORT OF SIXTEEN CASES. I. S. KAHN, J. Allergy **8:** 158 (Jan.) 1937.

Favorable results are reported from the use of epinephrine intravenously and from rectal anesthetization with ether and olive oil. Six of eleven patients were relieved by intravenous injection of from 1 to 2.5 cc. of a 1:10,000 dilution of epinephrine hydrochloride. The injection was stopped at the first signs of symptoms caused by epinephrine, viz., pallor, tremor, sweating, headache, cardiac pounding, nausea or vomiting. Four of ten patients to whom from 5 to 7 ounces (155.5 to 217.5 cc.) of a mixture of equal parts of ether and olive oil were administered by rectum obtained relief. The dose for a child from 5 to 9 years old is from 1½ to 2 ounces (46.5 to 62 cc.). Twenty minutes should be allowed for administration. The other six patients required epinephrine hydrochloride subcutaneously, in addition to the anesthesia.

In the interesting discussion that followed Dr. Kahn's paper several other therapeutic measures which have given relief in status asthmaticus were mentioned, including inhalations of helium-oxygen gas, continuous intravenous injection of fluids, administration of caffeine, caffeine with sodium benzoate, theophylline with ethylene diamine or dilaudid hydrochloride and bronchoscopic treatment. A word of caution was sounded as to the use of atropine in this type of case.

HOYER, Cincinnati.

EVALUATION OF THE RAGWEED HAY FEVER RESORT AREAS OF NORTH AMERICA. O. C. DURHAM, J. Allergy **8:**175 (Jan.) 1937.

A map is shown giving the location of approximately a hundred places where the concentration of pollen in the air has been determined. These places are listed, with the average number of hay fever days per season, the maximal contamination of the atmosphere, the average seasonal total and the ragweed pollen index.

Accessibilty, hotel accommodation and temperature are not considered, but both the map and the list will help a physician to locate a place for patients who suffer from hay fever.

HOYER, Cincinnati.

ALLERGY AS RELATED TO OTOLARYNGOLOGY AND OPHTHALMOLOGY: LITERATURE FOR 1936. F. K. HANSEL, J. Allergy **8:** 196 (Jan.) 1937.

This is an excellent review of the literature pertaining to allergy as related to the practice of otolaryngology and ophthalmology. It has an extensive bibliography, which contains several references to articles on children.

HOYER, Cincinnati.

ASTHMA DUE TO HOUSE DUST. L. G. MONTGOMERY, J. Indiana M. A. **30:**18 (Jan.) 1937.

Relief was obtained in 76 per cent of thirty cases of asthma in which house dust was considered the causative factor. General hygienic care, with adequate diet, is an important corollary to specific treatment.

MILLER, South Bend, Ind.

A New Phase of Intestinal Allergy. M. A. Ehrlich, J. M. A. Georgia **26**:5 (Jan.) 1937.

Eleven cases of intestinal allergy are presented. Rectal prolapse was present in six cases and rectal relaxation in three cases. In all the cases the stools were watery. Ehrlich claims priority for the observation of rectal prolapse and relaxation associated with intestinal allergy.

Morrison, Savannah, Ga.

Allergy to Amidopyrine: Blood Studies Following Anaphylactic-Like Shock in a Patient. M. B. Strauss, New England J. Med. **215**:177 (July 30) 1936.

Agranulocytosis was casually associated with the administration of aminopyrine by De Vries, Madison and Squier, and Watkins in 1933.

While the case reported was that of an adult, the first signs of sensitivity occurred in the "teen" age, and as aminopyrine has often been advised for use in pediatric practice, the possibility of a severe allergic reaction is worth noting.

The blood finding during the attack and during the next four weeks are shown in the table. No significant reduction in the numbers of polymorphonuclear leukocytes occurred at any time during this period.

Gengenbach, Denver.

Collapse While Swimming: The Most Dangerous Consequence of Hypersensitiveness to Cold. B. T. Horton and G. M. Roth, Proc. Staff Meet., Mayo Clin. **12**:7 (Jan. 6) 1937.

Hypersensitiveness to cold may be manifested by symptoms of syncope while swimming. Urticaria may occur. Immersion of the hands of persons sensitive to cold produces a drop in blood pressure, an increase in pulse rate and flushing of the face. These reactions suggest the release of a histamine-like substance in the tissues by cold.

Treatment consists in having the patient immerse the hands in water at 10 C. for one or two minutes twice a day for three or four weeks. Patients may also be desensitized of cold by subcutaneous injection of 0.1 mg. or less of histamine twice daily for two or three weeks.

Miller, South Bend, Ind.

Erythema Nodosum in Childhood. Mathilde de Biehler, Arch. de méd. d. enf. **39**:817 (Dec.) 1936.

Several theories exist concerning the origin and nature of this disease: It is regarded by some clinicians (Ferrand, Jochman, Bergman) as a manifestation of rheumatism; others (Comby, Achard) consider it as an independent infectious exanthematous disease capable of mobilizing tubercle bacilli, as is found in whooping cough and measles, while another group (Arloing, Dufour, Landouzy) declares that erythema nodosum is of direct tuberculous origin.

A constantly growing number of observers seem to reconcile the disorder with anaphylactic phenomena in the course of various diseases.

Since the reports of Cibils, Aguirre and Arena, who demonstrated the myobacterium in the nodules, the theory of the tuberculous nature of these nodules has been widely accepted. Primary and secondary types are described. The author has made observations in 106 cases in the children's infirmary at the University of Warsaw, the patients ranging in age from 6 months to 15 years. In these subjects, the tuberculin test was positive in 74 per cent; many had suffered antecedent invasions of measles, whooping cough or influenza. Several case histories are included in the report. The conclusions drawn from this extended study include:

1. The development of tuberculosis in the course of erythema nodosum is not as common as some authors assert; in only 2 of the cases referred to was the erythema followed by generalized infection.

2. The immediate prognosis is good; there were 2 deaths among the 106 children under observation.

3. Erythema nodosum may develop in the course of any infectious disease.

4. It has been demonstrated conclusively that the disease is communicable.

5. It is encountered most frequently at the beginning of the winter and of the summer season.

6. The disorder affects girls more often than boys.

7. While usually attacking the limbs, the nodules may appear on the face.

8. It is not as rare under 5 years as commonly believed.

AMESSE, Denver.

SOLITARY XANTHELASMOID FIBROSARCOMA OF THE SKIN: REMARKS ON THE SO-CALLED HISTIOCYTOMA OF THE SKIN. E. SCOLARI, Gior. ital. di dermat. e sif. **77**:589 (Aug.) 1936.

The patient was a baby aged 3 months in apparently perfect health. On the supraclavicular region a tumor the size of a walnut developed in the course of a few weeks. Histologic examination showed the lesion to be composed of connective tissue cells loaded with lipids, mostly true fats, and justified the diagnosis of fibrosarcoma. The protoplasm of many cells was filled with droplets of fat, which gave them the appearance of xanthoma cells. In some respects the histologic picture corresponded to that of the condition described as histiocytoma cutis. The presence of lipids in the connective tissue cells in this case suggests the hypothesis that they may be the product of altered cellular metabolism and not the result of phagocytic activity.

PARDO-CASTELLO, Havana, Cuba. [ARCH. DERMAT. & SYPH.]

NEUROFIBROMATOSIS OF RECKLINGHAUSEN IN CHILDREN. A. BARCAGLIA, Riv. di clin. pediat. **35**:107 (Feb.) 1937.

The forty-one cases of Recklinghausen's disease in children reported in the literature are reviewed. Barcaglia reports one case of his own. This occurred in a boy of 4 years, who showed the characteristic peripheral findings, namely, pigmented spots, tumors of the peripheral nerves (trigeminal and ulnar) and cutaneous tumors. The boy also showed a transitory increase in intracranial pressure with symptoms suggesting cerebellar tumor. The mother also had the disease. Barcaglia points out that Recklinghausen's disease should be considered in the differential diagnosis when a tumor of the brain is suspected.

HIGGINS, Boston.

ICTHYOSIS NIGRICANS. C. GIANELLI and M. E. MANTERO, Arch. de pediat. d. Uruguay **7**:478 (Oct.) 1936.

A child began to show marked dryness of the skin at the age of 15 months. Scaliness appeared at 2 years, and a few months later this changed and became widespread. The scales were very small and very dark in color. The thorax, abdomen and extensor surfaces of the limbs were symmetrically affected. The condition cleared up in twenty days with warm baths and applications of 5 per cent salicylic acid ointment. There was a family history of eczema. No search was made for tinea versicolor, which was not even considered. It appears doubtful that true ichthyosis would respond so rapidly to the treatment outlined.

SCHLUTZ, Chicago.

CONSTANT BACTERIAL FLORA IN CHILDREN'S HAIR. M. BIEHLER, Pedjatrja polska **16**:325 (Sept.-Oct.) 1936.

The work along this line is still meager. According to Hofman, investigation of the hair and nails shows that they possess bactericidal properties of an esophy-

lactic character. Biehler investigated 100 samples of hair, 400 investigations being made. The hairs were placed in different mediums at room temperature and at incubator temperature. The room temperature produced more bacterial growth than the incubator temperature.

The bacterium most frequently encountered at room temperature was Staphylococcus aureus, in 31 per cent; in the incubator it was present in 17 per cent. Other bacteria were seen occasionally. Yellow hair does not harbor any more bacteria than other types of hair. Bacteria were found in washed hair as well as in unwashed hair.

KRUPINSKI, Chicago.

Surgery and Orthopedics

DRAINAGE OF CEREBROSPINAL FLUID IN THE TREATMENT OF ACUTE HEAD INJURIES. D. H. WERDEN, Arch. Surg. **34**:424 (March) 1937.

There has always been considerable difference of opinion regarding the use of spinal puncture and the indications for surgical intervention in the treatment of acute injuries of the head. Werden in this comprehensive article shows that drainage of cerebrospinal fluid in cases of acute injuries of the head is not only without danger but is highly beneficial. It is assumed that the clinical observations all point to an increase of intracranial pressure as the outstanding finding in cases of cerebral concussion and to an excessive secretion of the cerebrospinal fluid as the principal factor causing this pressure. This justifies drainage of the cerebrospinal fluid. The value of spinal drainage in preoperative care and for determining when surgical intervention is indicated is thoroughly discussed. The contraindications for spinal drainage are discussed. In this study all the patients were treated with spinal drainage. It was concluded that there was definite therapeutic value with this method of treatment in a large percentage of cases of injuries of the brain ranging from mild concussions to severe injury of the head.

KAISER, Rochester, N. Y.

ABDOMINAL SURGERY IN INFANCY AND CHILDHOOD. G. HERZFELD, Edinburgh M. J. **44**:218 (April) 1937.

In the series of "Clinical Recollections and Reflections" which has run in the *Edinburgh Medical Journal,* Herzfeld, of the Royal Edinburgh Hospital for Sick Children, Glasgow, contributes a discussion on abdominal surgery. Surgical operation on the abdomen is remarkably safe in children even in the first few hours of life. In exomphalos there is an illustration of the tolerance immediately after birth for an extensive abdominal operation during which many of the viscera may be outside the cavity. During the first five years of life, the age period to which the author limits her paper, early diagnosis is essential because of the juvenile tendency toward rapid development of inflammatory lesions of the peritoneum; in obstructive lesions children lose ground rapidly from dehydration and toxemia. A point for early diagnosis is the sequence of vomiting, which in appendicitis follows the appearance of pain, while in pneumonia vomiting antedates pain.

Volvulus may be present at birth or may appear at about the third day. Early appearance is not noted with pyloric stenosis. The vomitus of volvulus is bile stained. A diverticulum is another error of development, and it may furnish a potential source of danger if it undergoes acute inflammation or if it becomes involved in intussusception, strangulation or obstruction.

A foreign body that has been ingested usually proves harmless. A coin may not pass the pylorus and must be removed if after from four to six days it fails to go through the pylorus. The Kirby grip (an article for fastening the hair) is sometimes swallowed; in three cases it has been shown that it cannot traverse the second part of the duodenum but requires operative removal.

Success in surgical treatment calls for attention to loss of fluid both before and after operation, for gentleness and speed, and for attention alone to the essen-

tial which necessitated the operation. Children have marvelous powers of recuperation, so that generally one need not be overanxious during postoperative treatment.

NEFF, Kansas City, Mo.

CORRECTIVE EXERCISES FOR POOR POSTURE. M. DESPAUX, Rev. méd.-sociale de l'enf. **5**:88 (March-April) 1937.

Despaux cites the findings of the school medical inspectors, who found poor posture in from 40 to 50 per cent of the children, indicating a need for training to combat deformities. He suggests a "corrective gymnastic school," which is to be preventive only and not to encroach on the work of the orthopedic clinics. The common faulty postures and their effects on the physiology of the child are discussed superficially. Among the factors causing vertebral deformities, poor nutritional states and what he calls the sedentary régime of the school child are emphasized. The remainder of the communication is devoted to a fairly detailed description of the usual corrective exercises for lordosis and scoliosis. The paper is a good casual review of the subject, without however, any reference to current literature.

DIETRICH, Beverly Hills, Calif.

THE MACROSCOPIC FORMATION OF THE ENAMEL DEFORMITIES CAUSED BY RICKETS OR SPASMOPHILIA AND A THEORY OF THE MECHANISM OF THEIR EVOLUTION. P. E. SJÖQUIST, Acta pædiat. **19**:281, 1937.

This paper presents the results of a carefully executed clinical study of the deformities of the permanent teeth which are produced by rickets and tetany. In order to study the deformities due to rickets approximately 3,000 Swedish children were examined; their ages varied between 7 and 14 years. Deformities due to tetany were studied in 150 patients. The results are enumerated and described in such detail as to render the paper unsuitable for abstracting. Numerous photographic illustrations are provided; unfortunately, these are not entirely satisfactory from the point of view of clarity. It is to be regretted that this highly interesting report should have been published in English which is sometimes so ambiguous as to leave considerable doubt as to the meaning. The highly technical character of the paper will render it more comprehensible to dentists than to pediatricians.

MCCUNE, New York.

Miscellaneous

PARA-AMINO-BENZENE-SULFONAMIDE AND ITS DERIVATIVES. P. H. LONG and E. A. BLISS, Arch. Surg. **34**:351 (Feb.) 1937.

Long and Bliss describe briefly the action of the compounds which were tested in the clinical use of sulfanilamide (para-aminobenzenesulfonamide) and its derivatives in the treatment of human beings with infections due to hemolytic streptococci. Experimental observations suggest that these compounds act by inhibiting the growth of beta hemolytic streptococci and that they injure these organisms in such a way as to permit them to be phagocytosed by the white blood cells. Several different preparations were used for a variety of infections produced by beta hemolytic streptococci. The method of administration and the dosage of the drug for the various types of infections are described. It is concluded that this drug and its derivatives have a specific chemotherapeutic effect in infections produced by beta hemolytic streptococci.

KAISER, Rochester, N. Y.

ACIDOSES ASSOCIATED WITH THE ADMINISTRATION OF PARA-AMINO-BENZENE-SULFONAMIDE (PRONTYLIN) [SULFANILAMIDE]. H. SOUTHWORTH, Proc. Soc. Exper. Biol. & Med. **36**:58 (Feb.) 1937.

Two cases of clinical acidosis were observed following the administration of sulfanilamide (para-aminobenzenesulfonamide) to fifty human subjects. In fifteen

consecutive patients treated with this drug there was a fall in the carbon dioxide-combining power of the blood plasma varying from 1.9 to 27.3 volumes per cent, with an average fall of 14.1 per cent. There was no clinical evidence of acidosis in any case. In an afebrile subject suffering from no streptococcic infection, the carbon dioxide-combining power fell from 59.8 to 37.2 volumes per cent after the ingestion of 6.9 Gm. of sufanilamide. The mechanism of the acidosis is as yet unknown.

HANSEN, Minneapolis.

SUGGESTIONS TO FACILITATE VENIPUNCTURE IN BLOOD TRANSFUSION, INTRAVENOUS THERAPY, AND INTRAVENOUS ANESTHESIA. J. S. LUNDY, Proc. Staff Meet., Mayo Clin. **12**:122 (Feb. 24) 1937.

Application of moist heat to an extremity for one-half hour produces local congestion, so that when a tourniquet is applied the veins stand out prominently. Application of cold antiseptics to the skin produces reflex contraction of the veins, rendering venipuncture more difficult. Venipuncture may be rendered practically painless by injecting procaine hydrochloride near the vein.

MILLER, South Bend, Ind.

DISEASES TRANSFERABLE TO MAN FROM DOMESTIC ANIMALS. P. R. B. SMITH, South African M. J. **11**:43 (Jan. 23) 1937.

Smith discusses the diseases of domestic animals which are dangerous to man —tuberculosis, rabies, anthrax, glanders, malignant edema, Malta fever, trichophyton skin diseases, tapeworm and trichinella infection, paratyphoid, foot and mouth disease, psittacosis and pox. In most of these the danger can be averted by adoption of simple precautionary measures. In others this is impossible without the help of the health department, which through prescribed laws can reduce the danger to man to a minimum.

GONCE, Madison, Wis.

FIFTEEN YEARS' PEDIATRIC PRACTICE IN CAIRO. I. SHAWKI, J. Egyptian M. A. **20**:1 (Jan.) 1937.

This article hits the high spots of pediatrics in Cairo, with cursory remarks about everything from problems of behavior to intussusception. The only noteworthy remarks seem to be that since the introduction of dried milk preparations diarrhea has appeared more easily handled, and that paratyphoid B infections have as a prominent feature colic and diarrhea.

MULHERIN, Augusta, Ga.

SPECIFIC ANTIVENENE IN THE TREATMENT OF "KNOPPIE-SPIDER" BITE. M. H. FINLAYSON, South African M. J. **11**:163 (March 13) 1937.

By precipitation tests the venom of Latrodectus indistinctus is shown to possess the same antigens as the venom of Latrodectus concinnus but also an additional one. Guinea-pigs made acutely ill by intravenous injection of the venom of L. indistinctus recovered promptly following treatment with L. indistinctus antiserum (goat). All of eighteen persons treated for spider bite with antiserum recovered, and, although the mortality from spider bite is low, it may be assumed that antiserum has some therapeutic value in such cases.

GONCE, Madison, Wis.

LEAD POISONING IN CHILDREN AND ITS PREVENTION. J. R. ROSS and A. BROWN, Bull. Assoc. internat. de pédiat. prevent. **4**:11, 1937.

Lead poisoning is a frequent cause of convulsions in children aged from 1 to 4 years. Park and his associates, of Baltimore, and Vogt, of Boston, showed independently, in 1930, that the diagnosis could be established by the x-ray film, but actual detection of lead in the excretions is necessary in confirmation of this opinion.

The principal sources of lead in these cases are noted. Children suffering from pica may ingest soil containing lead; furniture, toys and play pens may be covered with lead paint.

The authors have treated twenty-three children with lead poisoning at the Hospital for Sick Children, Toronto, in the past two years; nine of these had cerebral involvement on admission, and three died. Of children between the ages of 1 and 4 years who entered the hospital with convulsions during a period of six months, one third were found to be suffering from lead poisoning. AMESSE, Denver.

ROENTGENOGRAPHIC METHOD FOR SUCCESSIVE EXAMINATION OF AN INFINITE NUMBER OF PARALLEL PLANES OF AN OBJECT. B. G. ZIEDSES DES PLANTES, Nederl. tijdschr. v. geneesk. **79**:5852 (Dec. 21) 1935.

A roentgenographic method is described by which it is possible to examine an infinite number of parallel planes of an object successively. For this purpose roentgenograms are made of the object from several directions that differ only slightly. By placing these roentgenograms on top of each other in a certain manner and sliding them over each other, one successively sees different planes coming to stand out definitely. VAN CREVELD, Amsterdam, Netherlands.

Society Transactions

PHILADELPHIA PEDIATRIC SOCIETY

H. H. Perlman, M.D., *President*

Oct. 13, 1936

James E. Bowman, M.D., *Secretary*

Massive Congenital Diaphragmatic Hernia. Dr. Edward D. Atlee.

A full term baby, apparently normal at birth, was examined sixteen hours after birth and found to have abnormal sounds in the left side of the chest, with the heart on the right side. An x-ray picture verified the probability that intestinal coils were in the left side of the chest, but before operation could be considered death occurred. A complete autopsy was performed.

The literature is reviewed, and reports of other cases are quoted in part. This case is presented to bring out the fact that the condition is not as rare as once was thought, that it is seldom definitely diagnosed without the help of an x-ray picture and that it is one of the less frequent causes of cyanosis in the new-born.

DISCUSSION

Dr. Max M. Strumia: First I should like to show two lantern slides to illustrate the picture seen by the roentgenologist, Dr. Bromer, who I hope will make some comments later. The other slides illustrate the lesion. It is seen that when the chest was opened the left pleural cavity contained the whole ileum, the cecum and the ascending and transverse portions of the colon. There was an unusually long mesocecum. The spleen appeared partly in the pleural cavity. The left lung was entirely atelectatic, and with the heart pushed to the right the mediastinum greatly limited the expansion of the right lung.

It was felt at the autopsy, after careful search, that to repair the damage at operation one of the most difficult things would have been to return the organs into the abdomen. It would not have been so difficult to repair the hernia, although this was considerable. The opening in the inner and anterior portion of the left side of the diaphragm was nearly 3 cm. in diameter. Repair could have been made, according to Dr. Flick, by taking a fold of the pedicle of the spleen, which appeared like a peritoneal fold, and stripping it across. To give a more exact idea of the location of the defect, I may say that when one looked down on it one could see the tip of the left kidney, the left adrenal gland and the spleen coming through the opening after reduction of the intestinal coils.

The history of the case presented now, as well as that of a number of cases reported in the literature, shows that cyanosis was not present at birth, but that it occurred later on, in our case more than twelve hours after delivery. This is explained by the fact that when the intestine was empty it did not occupy a large space and therefore at most it kept the lung on the affected side from expanding. However, with intake of food and development of gas in the stomach and in the remainder of the intestinal tract considerable positive pressure developed in the intestinal coils which had herniated through the diaphragm, causing displacement of the mediastinum on the opposite side, limitation of the expansion of the lung on the unaffected side and cyanosis, which appears to be the earliest essential symptom.

Dr. Ralph S. Bromer: The case reported here is the first of the type in the new-born which I have seen. In 1921 I saw my first case, in a girl 4 years of age, and I suggested that a barium sulfate meal be given her because of the appearance

in the roentgenogram of the left side of the chest. In the lantern slide shown by Dr. Strumia the typical appearance of a gas-filled bowel in the chest makes the diagnosis comparatively easy. However, in an older child the diagnosis may be more difficult owing to the fact that the intestines may be filled with feces producing dense shadows at the time of examination. Likewise, the clinical signs may vary owing to the presence at one time of gas and at another time of feces in the bowel lying in the chest. In the second case which I encountered I did not suspect that the condition was present, and Dr. John P. Scott suggested that a barium sulfate meal be given to prove the herniation.

Patients with anomalies of this type do reach adult life, as shown in the case observed by Dr. Newcomet, who discovered an appearance of the left side of the chest and a herniation exactly like this in a boy of 19, a mile runner. This patient was referred to him for examination on account of possible chronic appendicitis. In the 4 cases in my experience a portion of the small bowel and a smaller section of the large bowel were shown in the chest, with the stomach displaced downward into the lower part of the abdomen and pelvis.

REPORT OF A CASE OF SCURVY WITH AN UNUSUAL SYMPTOM. DR. HARRY LOWENBURG SR., DR. WILLIAM P. SHIELDS and DR. DAVID TURNOFF, with Roentgenologic Report by DR. HERMAN OSTRUM.

This article was published in full in the July 1937 issue of the AMERICAN JOURNAL OF DISEASES OF CHILDREN, page 73.

DISCUSSION

DR. RALPH S. BROMER: Dr. Ostrum covered all the points in the diagnosis of infantile scurvy from the roentgen standpoint. In 1923 Pelkan pointed out that by the time the zone of rarefaction behind the dense zone of temporary calcification in the metaphysis had appeared the condition had developed sufficiently to make a clinical diagnosis possible. Preceding this, he stated, the signs of scurvy were: thinning of the cortices of the long bones; the characteristic ground glass appearance, and the dense rings surrounding the epiphysial centers of the long bones. All these signs can be seen before the evidence of subperiosteal hemorrhage can be found in the x-ray film.

STREPTOCOCCIC MENINGITIS, WITH RECOVERY FOLLOWING MASTOIDECTOMY AND INTRASPINAL USE OF LYOPHIL CONVALESCENT SCARLET FEVER SERUM. DR. JOHN P. SCOTT and DR. SAMUEL X. RADBILL.

Recovery from meningitis caused by Streptococcus haemolyticus, apparently secondary to a severe infection of the upper respiratory tract, with otitis and mastoiditis, is here reported. In addition to mastoidectomy and the usual supportive treatment, lyophil convalescent scarlet fever serum was administered intraspinally. We feel that while natural forces must be given credit for the recovery the serum used may have been of some aid and we think that serum may be well worth trying on other occasions.

DISCUSSION

DR. AIMS C. MCGUINNESS: Dr. Radbill mentioned that the concentrated lyophil serum used in this case appeared to cause considerable pain when injected intrathecally. Double concentration of lyophil serum has been recommended for routine intramuscular injections, but it appears preferable to give this serum in isotonic solution when it is injected intrathecally. It is possible that the pain incident to the intrathecal injection of double strength serum was due to increase in intracranial pressure following the introduction of this hypertonic solution.

In 5 other cases of meningitis due to the hemolytic streptococcus, treatment with lyophil convalescent scarlet fever serum has been employed. Three of the patients were moribund when first seen and died within the first twelve hours

following the initial injection of serum. In the other two cases treatment was initiated early in the disease, and in both instances there was considerable improvement, as indicated by a lower spinal fluid cell count, disappearance of the organisms from the fluid and a decrease in general toxicity. In both instances, however, relapse followed this early improvement, and the cases terminated fatally.

I might add a word in regard to the indications for convalescent scarlet fever serum in streptococcic meningitis and in other hemolytic streptococcus infections. Unlike the commercial horse serums, which show only antitoxic properties, convalescent scarlet fever serum contains antibacterial antibodies in addition to a certain amount of antitoxin. This point has recently been stressed by Lyons, Hara, Ward and others. It is the antibacterial antibodies which control the spread and invasion of the organisms. In addition to possessing antibacterial antibodies, convalescent serum does not produce anaphylactic reactions such as frequently follow the use of horse serums.

DR. EDWARD H. CAMPBELL: This case presents to the otolaryngologist a basis of discussion along several different lines, a few of which I should like to mention. First is that of the route of travel to the meninges. In the past the route has been considered to be by direct extension of the infection. In more recent years investigators have gradually come to the conclusion that that mode of spread is secondary, the most important being by venous circulation. By "venous circulation" is meant septic thrombosis of the small venules in the involved areas, the thrombosis spreading with the circulation or, in a retrograde manner, against the circulation. This would mean in a case of infection of this kind infection of the middle ear or mastoid involving eventually a small venous network in the middle ear or mastoid and causing septic thrombosis, extension through the bony plate separating the mastoid from the brain and transmission through the bone itself without breaking-down of the bone. The septic thrombosis involves a venous network in the dura and an intracerebral network and eventually involves the arachnoid, with rupture of the septic veins, giving rise to localized or diffuse meningitis. In order to cause such meningitis it is necessary that there should be a rupture of these veins. The pathway described is by far the most common route of invasion from the mastoid and middle ear into the brain. It is not only from the mastoid but from the middle ear that this venous network connects with the veins of the dura and the intracranial veins; while invasion of the brain is more commonly secondary to mastoid infection, it can occur from middle ear infection alone.

The second mode of invasion, a common one, observed many times in the past, is direct extension by necrosis, a breaking-down of the tegmen or bony plate between the mastoid or middle ear and the brain. The organisms attack the posterior or middle cranial fossa, later the dura and later the arachnoid and subarachnoid fluid to cause meningitis.

The third mode of invasion from the middle ear or mastoid is through the perineural spaces of the auditory, vestibular and facial nerves, as well as the olfactory nerve when there is associated sinus infection. Direct infection may then spread to involve the adjacent meninges. In addition, the labyrinth is a direct pathway because the fluid of the labyrinth has direct communication with the cerebrospinal fluid.

The fourth route of transmission is through the arterial system; thrombophlebitis occurs, causing septicemia, with lodging of infected material in the meninges to cause meningitis.

Lastly and probably least important is the lymphatic circulation. Investigators have not definitely determined any lymphatic connection of the ear and mastoid with the meninges, but emphasis by some authors has been given to this, and it may be of some importance.

A second angle from which this case might be discussed is that of the treatment which should be given to a mastoid and ear from infection of which meningitis has developed. The first procedure in the handling of such a case is the

surgical removal of the entire focus. This means not only thorough cleansing of the mastoid bone but breaking down the bone separating the mastoid process from the dura, uncovering the lateral sinus through the mastoid bone and uncovering the middle and the posterior cranial fossa as far as possible. If necessary, radical mastoidectomy should be done to expose the middle ear and to break down the tegmen tympani. I think all believe that the meninges, as well as other parts of the body, can take care of infection if continuous infection is not being supplied to them. The second procedure may be to open the dura, if a break is found. Third, the wound should be kept wide open; there should be no gauze packing. There should be frequent irrigations of the wound. The treatment in general, then, should be, first, the removal of the primary focus of infection as far as this can be determined. In the present case, although the left ear was infected first, the other ear became infected soon afterward, and complete mastoidectomy was done on both sides. In the active treatment of the meningitis, the following has been suggested: The cerebrospinal fluid should be drained intermittently by tapping of the spine or continuously. Forced drainage, which consists in intravenous injection of hypotonic solution which drains into the meninges of the brain, has been highly recommended. Specific serums may be given. In this case they probably had more to do with recovery than anything else. Autogenous vaccine is not very important. Frequent small blood transfusions are of much help.

In this case the culture from the mastoid was, I think, Staphylococcus, while in the cerebrospinal fluid Streptococcus was found. We feel that this can be explained on the basis that the contamination of the meninges did not arise from the mastoid. There is in most cases coexisting sinus infection. In mastoid infection with coexisting sinus infection the involvement of the meninges may be by way of the sinuses and not through the mastoid. Therefore, two different organisms may be found in the cultures from the mastoid and the cerebrospinal fluid.

Dr. John P. Scott: All things have their beginnings. If this treatment has a record of 5 deaths and 1 recovery, it is better than any that has appeared hitherto.

It is important to realize that recovery in this case may be due to measures other than serum therapy. It may have followed thorough débridement of the mastoid. Operation was performed several hours after admission of the patient to the hospital, and continued contamination of the meninges from the mastoid was therefore lessened. Another measure was transfusion. This girl had five large ones.

In favor of the serum's being responsible for recovery are several facts. First, the organism from the mastoid was not that found in the cerebrospinal fluid; infection of the latter, therefore, might have come from the nasal sinuses, and mastoidectomy would not help this. Second, while recovery is reported to have followed operation alone, such an event is certainly not common, and to my knowledge has not occurred in any one's experience at the Children's Hospital. The greatest argument against the serum's agency here is in the fact that the fluid cleared before the serum was given; this clearing was not permanent, for the fluid became infected again, and a second time cleared.

The reaction to the intrathecal injection of the double strength lyophil serum was interesting. With the first few drops there was evident severe pain in the trunk and extremities. I do not agree with Dr. McGuinness that the pain was due to pressure. True, the fluid was introduced under pressure, because there was no other way of getting it in. I believe the pain was due to irritation of nerve roots by the serum, either because of the osmotic effect of a 12 per cent protein solution or because of some purely chemical irritation, such as would be caused by an acid or alkali.

I should like to see this serum given a trial in cases of this type. I do not recommend its administration in double strength, as we used it, but in normal concentration. Only by accumulating a series of sufficient size can one decide as to its value.

Dr. Harry S. Lowenburg Sr.: I have nothing to add. It might be of interest to detail briefly my experience with spinal drainage as advised by Love of the Mayo Clinic. I am at present treating a boy with otitic meningitis. I introduced into his spinal canal a no. 5 French radiopaque ureteral catheter. This method was described by Love in *The Journal of the American Medical Association* (**104**: 1595, 1935). I believe it is a valuable way to secure drainage. It does away with the need for the Bradford frame. This is one of its main advantages. However, one danger must be borne in mind. Even though the catheter was cut 3 inches (7.5 cm.) beyond the patient's skin, after about forty-eight hours it had worked itself sufficiently into the spinal canal to cause the distal tip to disappear about a half inch below the skin surface, as revealed by an x-ray picture. The catheter was recovered by Dr. M. Behrend, with Dr. Louis Edeiken cooperating with the fluoroscope. In spite of this accident, however, I believe the method to be a valuable one for drainage and suggest that considerably more than 3 inches of catheter be permitted to extend beyond the patient's body and that the distal end be secured with adhesive tape appropriately placed over a gauze dressing. I do not believe, however, that drainage per se can be depended on to cure any type of meningitis. The report of the case of the evening is extremely interesting and hopefully encouraging in a disease which presents such high mortality. Conclusions may not be drawn from a single case and, as Dr. Radbill says, recovery in this instance may well be due to the healing power of nature.

Dr. Robert Schless: I merely add that instances of recovery from streptococcic meningitis, as reported in the literature, particularly in Dandy's hands, have shown definite connection between the removal of the focus of infection and the subsidence of the meningitic inflammation, just as in this case presented by Dr. Scott.

Evidently, the meningeal infection in Dr. Scott's case was not particularly virulent, as shown by only 2 positive cultures in the 6 spinal fluids taken; also, chlorides were not markedly reduced. As Dr. Scott said, the spinal canal can take care of infection if the suppurative focus is eliminated.

This should be taken into account in considering recovery in this particular instance.

H. H. Perlman, M.D., *President*

Nov. 10, 1936

James E. Bowman, M.D., *Secretary*

A Case of Primary Aplastic Anemia in an Infant. Dr. James E. Bowman.

A girl baby weighing 7 pounds and 12 ounces (3,969 Gm.) was born of healthy parents. At 3 days of age she showed purpuric spots, moderate anemia and prolonged coagulation of the blood, which were thought to be signs of hemorrhagic disease of the new-born. Treatment for this condition in the form of a transfusion of maternal whole blood was instituted. This baby again came under my attention at the age of 2 months, when severe anemia was noted. It was not until the age of 5 months that she was studied thoroughly. The clinical picture from this point on was essentially one of increasing anemia with no evidence of regeneration. There were no signs of destruction or of infection of the blood. All the formed elements of the blood were reduced.

DISCUSSION

Dr. Ralph M. Tyson: There are just a few words that I wish to say about this case, especially from the standpoint of the differential diagnosis. There has been a suggestion of lymphatic leukemia in the leukopenic stage in this baby. This is only of academic interest, for whether the condition dealt with is aplastic

anemia or leukemia the outcome will be the same. There are a number of observations pointing to aplastic anemia: In the first place, there is no enlargement of the lymph glands; in the second place, the spleen has not been enlarged, and in the third place, biopsy of the bone marrow shows that lymphocytes have not invaded that structure. It has been my observation in studies of several aleukemic leukemias that those three changes occurred in all of them. I think one ought to emphasize that the color index is 1; so the amount of hemoglobin produced in the red cells seems to be normal. The bone marrow seems unable to produce the erythroblastic elements.

Dr. Edward Steinfield: I did not quite gather from Dr. Tyson's discussion whether the lymphocytes, which apparently predominate, were all entirely normal. Occasionally in some of these aleukemic or, more accurately, leukopenic types of leukemia one may find on careful search some lymphocytes showing signs of immaturity. I should like to ask whether such cells were studied from this point of view.

Dr. James E. Bowman: The lymphocytic cells were entirely normal.

Comparison of Oral, Axillary and Rectal Temperatures: A Clinical Study. Dr. Joseph Levitsky.

A study was made of temperatures taken in the axilla, mouth and rectum in 48 patients at Temple University Hospital and in 16 patients with scarlet fever at the Philadelphia Hospital for Contagious Diseases and of axillary and rectal temperatures in 11 infants at Temple University Hospital. Temperatures were recorded two or three times daily for periods of from seven to fourteen days, making a total of approximately 2,093 temperatures.

The averages in the first 64 cases in which oral, rectal and axillary temperatures were recorded show a difference between oral and rectal temperature of 0.52 F., a difference between axillary and oral temperature of 0.71 F. and a difference between axillary and rectal temperature of 1.23 F.

Four charts are shown which demonstrate that sex, age and disease have little influence on the comparative oral, rectal and axillary temperatures. There seems to be greater comparative difference in the higher temperatures, according to the chart.

DISCUSSION

Dr. Joseph Stokes Jr.: I was wondering how far the thermometer was inserted and for how long.

Dr. Joseph Levitsky: The temperature readings were reported simultaneously in the usual manner, and I specified in my instructions a period of five minutes. I cannot vouch for the nursing staff, but I believe that the period was five minutes. For taking rectal temperatures the thermometers were inserted about 1½ inches (4 cm.).

Dr. Joseph Stokes Jr.: The general difficulty in taking rectal temperatures is to have the thermometers inserted the proper distance. It seems to me that the marking of the thermometer at a certain point is extremely important in the recording of these temperatures.

Dr. Hyman I. Goldstein: Were these temperatures read daily at the same time? There is a normal difference between early morning and afternoon readings. In reading the rectal temperatures I wonder not so much whether the thermometer was inserted an inch or an inch and a half as whether the buttocks were compressed. Compression of the buttocks makes a difference.

Dr. Joseph Levitsky: The rectal temperatures were made without compression of the buttocks. The temperatures were taken at specified hours—at 8 a. m., 12 noon and 4 p. m., or as near as possible to those times. It was a purely clinical research.

DR. RALPH M. TYSON: As this was a purely clinical research, no attempt was made to make it ultrascientific. The object was to see whether in the routine taking of temperatures—rectal, axillary and oral—there was much difference in the absolute results.

DR. ARTHUR DANNENBURG: With regard to rectal thermometers, a number of mothers have told me that druggists had informed them that the calibration of the rectal thermometer is different from that of other thermometers; that if the temperate is 98.6 F. by rectum it is normal. Druggists should be informed that all thermometers are calibrated in the same way and that a difference exists only in the end of the thermometer.

H. H. PERLMAN, M.D., *President*

Jan. 12, 1937

JAMES E. BOWMAN, M.D., *Secretary*

CHRONIC LIPOID CELL PNEUMONIA IN INFANTS AND YOUNG CHILDREN. DR. IRVING J. WOLMAN.

Within the past few years 20 children with chronic lipoid cell pneumonia have been observed at the Children's Hospital, Philadelphia. In 14 of these the condition was diagnosed at necropsy, while in the remaining 6 the roentgenologic and clinical features conformed exactly with the descriptions recently given by Goodwin and by Ikeda.

Twelve of the children were under 1 year of age at death.

Thirteen of the children had some physical debility or neurologic disorder, such as idiocy, marasmus, mongolism, prematurity or congenital syphilis. The symptoms presented were, in the order of frequency, retardation of growth, frequent head colds, chronic hacking cough and recurrent vomiting. Clinically, only 5 had physical signs within the chest and these were minimal.

Pathologically, the lesions were localized in the perihilar and posterior dependent portions of the lungs, and were larger and more abundant in the right lung than in the left.

The clinical records did not always indicate the source of the oil. Five children had a history of intranasal treatment with oil drops. Two children had been given mineral oil regularly by mouth. It seems wise to avoid the intranasal use of oil drops and the administration of cod liver oil or liquid petrolatum to any small or weak or debilitated child. Infants who are subject to attacks of vomiting should be kept on the side or on the abdomen rather than on the back.

The frequency of this kind of chronic pneumonia is indicated by the discovery of 12 instances in 137 consecutive necropsies.

DISCUSSION

DR. JOHN P. SCOTT: I am interested as to whether there is any way of telling by a staining reaction whether this fat is animal fat, vegetable fat or mineral fat. Would it not be important to know this in some of the cases? In my practice I have used oil drops intranasally for a long time and do not remember any condition such as this developing. For this reason, I feel that in a well nourished infant, capable of controlling the faucial reflexes, there is little danger from this source. The swallowing of food might come into the question in the case of the premature infant, in whom food might slip down the larynx into the trachea and lungs. In such children, special care should be taken to deliver the food to the stomach. The premature infant with a poor swallowing apparatus would be better fed through a tube than in the ordinary manner. Dr. Wolman has worked this subject up so well that further discussion is difficult.

DR. JULIAN P. LYON: I was interested in the subject a few years ago when I first heard the condition named, and I wondered whether I had missed a great many cases of lipoid pneumonia. I think that one should remember the facts which Dr. Wolman and Dr. Scott have brought out—that this disease occurs in rather markedly debilitated children and in very young children rather than in the average run of patients in private practice. I have been amazed to find in contact with one hospital in town that the rhinolaryngologists there use a great deal of oil in the nose and throat. I have tried to steer away from this, especially since I have known about lipoid pneumonia.

DR. IRVING WOLMAN: With regard to staining reactions, there is at present no satisfactory method of recognizing the kind of fat.

EMILY BACON, M.D., *President*

March 9, 1937

JAMES E. BOWMAN, M.D., *Secretary*

INFLUENCE OF TONSILLECTOMY ON RHEUMATIC INFECTION. DR. RACHEL ASH.

This article will be published in full, with discussion, in a later issue of the AMERICAN JOURNAL OF DISEASES OF CHILDREN.

CHRONIC STRIDOR IN INFANCY. DR. CHEVALIER L. JACKSON and DR. JAMES E. BOWMAN.

Thirty cases in children examined over a five year period were analyzed. Cases due to acute inflammation were eliminated. The causes of this symptom were: congenital relaxation of the larynx, in 14 patients; enlargement of the thymus gland, in 5 patients; congenital stenosis of the larynx, in 3 patients, and, in 1 patient each, cyst of the thyroglossal duct, tuberculosis of the bronchial lymph nodes, micrognathia, collapse of the trachea, congenital heart disease, hypertrophic laryngitis and laryngismus stridulus. There was a patient in whom the cause was never determined.

Several features of the symptom of stridor itself were interesting. In the patients whose condition was diagnosed as congenital relaxation of the larynx stridor was more marked on inspiration and first appeared at birth or during the first month after birth. In the infants with enlargement of the thymus the noisy breathing was most marked on expiration and had its onset as follows: at birth in 2 patients, at three weeks in 1 patient, and at three months in 2 patients.

DISCUSSION

DR. JOHN DONNELLY: I should like to ask whether laryngoscopic inspection was made before treatment in those cases in which definite thymic enlargement was shown by the x-rays.

DR. HYMAN I. GOLDSTEIN: Have Drs. Jackson and Bowman met with hypocalcemia in association with stridor or laryngeal tetany? In children laryngeal spasm is characteristic of tetany (with carpopedal spasm). Alkalosis may give rise to laryngeal tetany or spasm. Laryngeal spasm may occur with gastric tetany and pylorospasm. Roentgen therapy over the thymus and parathyroids has at times cured not only the enlargement of the thymus but also the laryngeal stridor and pylorospasm. The administration of parathyroid extract (by injection) has sometimes been of help in such cases (with calcium therapy). Perhaps dysparathyroidism is a factor in rare cases, and this must be thought of when no other cause, such as papilloma or congenital defect, is discovered.

DR. JAMES E. BOWMAN: I think probably Dr. Jackson can answer Dr. Donnelly's question. As for Dr. Goldstein's question, we have no data on the calcium-phosphorus ratio to report.

DR. CHEVALIER L. JACKSON: As to endoscopic examination: We have looked at some of these tracheas, and in some we get a picture very much like collapse of the trachea. In fact, there was a case, I remember, in which we found some persistence of anterior compression even on inspiration, and on expiration the trachea seemed to be completely closed. In 2 or 3 cases in the series we observed this. Generally we have taken roentgenograms of these patients first for evidence of thymic enlargement with tracheal compression; then we have at once given treatment and have not made endoscopic examinations unless the stridor persisted. In this work on diagnosis of thymic enlargement we acknowledge our debt to the work of Pancoast and Pendergrass, who have done perhaps the most thorough and certainly the earliest very thorough work in connection with roentgen diagnosis of the enlarged thymus.

DR. JOHN DONNELLY: I am interested in cases in which compression seems to be from the posterior rather than from the anterior aspect. Will an enlarged thymus in a child from 1 to 3 years of age produce a compression that you can see by endoscopic examination?

DR. CHEVALIER L. JACKSON: I really cannot answer that question because we have not made a systematic endoscopic study. It would be very interesting to do it, but we just have not done it, because it has not seemed necessary.

Dr. Bowman and I had a conference with Dr. Edward Chamberlain recently; we went over the whole series of cases in which thymic enlargement had been reported.

DR. JAMES E. BOWMAN: We have not felt sure about laryngeal tetany. One of our cases we ascribe to this in spite of the fact that the calcium-phosphorus ratio was normal. Of the cases reported in the literature that we have studied, in some the condition was due to agenesis of the brain or other central lesions, often associated with lack of mental development and paralyses.

DR. PHILIP S. BARBA: Did you notice any difference in the stridor when the children cried, slept or were breathing quietly?

DR. JAMES E. BOWMAN: Yes, a very marked difference; in most of these cases the stridor changed with the emotional reaction of the child. In most cases it varied a great deal, and often it was absent during sleep. With congenital stenosis it seems to be present regardless of position, although it varies in intensity with emotional states, during feeding and so forth.

A CASE OF PROBABLE CONGENITAL TUBERCULOSIS. DR. WALLACE CLELAND.

A baby girl weighing 7 pounds and 9 ounces (3,430 Gm.) was born at term of a mother who had been well during pregnancy except for an undiagnosed bout of fever of a few days' duration, during which an x-ray picture of the chest was inconclusive. The mother began to show signs of clinical tuberculosis on the fourth day post partum, with fever and roentgen evidence of changes in the chest. She did not cough or expectorate.

The baby was well until the second day, when an elevation of the temperature developed, and because of a bloody vaginal discharge she was given mother's blood intramuscularly. The fever continued without evident cause. The liver and spleen were enlarged. The infant was breast fed until the sixth day, when the mother was suspected of being tuberculous. On the ninth day an x-ray picture of the chest showed shadows which gave an impression of bronchopneumonia—a Mantoux test with 0.01 mg. of old tuberculin had been strongly positive on the eighth day. Blood, spinal fluid and gastric residuum were injected into guinea-pigs, all the inoculations returning positive results. The baby died on the twenty-fifth day, and autopsy revealed miliary tuberculosis.

I think that the infection was intra-uterine because (1) a Mantoux test positive within thirty days after birth indicates intra-uterine infection according to Zarlf (the patient reported is the youngest baby with a positive Mantoux test on record) and (2) the mother was not discharging tubercle bacilli either from the respiratory tract or from the mammary glands.

DISCUSSION

Dr. John P. Scott: This child came under my observation when but a few days old. Because of the pulmonary findings and the tuberculous history in the family, a test was done with 0.01 mg. of old tuberculin. We were surprised to find a strongly positive reaction. This is the first case of this type that I have seen. I believe that such cases must be very rare, judging by the infrequency with which they are reported in current journals. I believe that this infection took place before birth. I cannot conceive of a process so widespread developing in the course of so small a number of days.

Book Reviews

The Patient and the Weather. By Dr. William F. Petersen, assisted by Margaret E. Milliken, S.M. Price, $10. Pp. 663, with 443 illustrations. Ann Arbor: Edwards Brothers, Inc., 1937.

Volume IV, part I of this book is concerned chiefly with the reactions of patients having some type of cardiovascular-renal disease to changes in atmospheric environment, particularly to changes in barometric pressure. The first chapter, with the title of "Asclepian Ramble," deals with the meteorologic background of a few dramatic and rather well known cases. A complicated freudian analysis is placed beside a weather report; one is left to judge which is the more likely explanation of laryngitis.

Again one is struck by the author's painstaking attempt to lay all possible cards on the table. He rides his hobby, but is absolutely honest; a reader with an unprejudiced mind must be convinced that great biologic adjustment is demanded by rapid environmental (meteorologic) shifts. In disease, particularly if the heart is involved, an inability to meet this demand is associated with further injury to the organism because of greater interference with the supply of oxygen to the tissues. In endocarditis, pressor episodes are associated with a numerical increase in the bacteria in the blood. A chapter on the experimental production of bacterial endocarditis in dogs by Dr. A. J. Nedzel is instructive. It shows that changes in the endothelium of the valves are associated with pressor episodes; the effect is one of increasing stickiness, tending to cause the adherence of organisms in the blood stream.

As in the previous volumes, numerous case histories are presented showing the correlation between meteorologic data, clinical conditions and factors in the chemistry of the body. In one section are discussed the major rhythm of the season as reflected in the p_H of the blood, modification by the sex rhythm, the imposition of the meteorologic rhythm and the diurnal and interdiurnal rhythm. These are considered in relation to emotion, trauma and infection and also in relation to the different types of physique, the leptosomatic and the pyknic being taken as the normal extremes. On various combinations of these factors depend exaggerations of either the A.R.S. phase (anabolism, reduction and spasm) or the C.O.D. phase (catabolism, oxidation and dilatation).

The Backward Child. By Cyril Burt, M.A., D.Sc. Price, $5.00. Pp. 694, with 13 illustrations and 24 tables. New York: D. Appleton-Century Company, Inc., 1937.

The writer reports his views and conclusions on mental retardation, which have been acquired after many years of intensive clinical study. The studies have been made from all possible points of view—hereditary, physical, intellectual, emotional, economic and sociologic.

"Sixty distinguishable conditions have been reported." The relation of retardation to such conditions as height and weight, condition of tonsils and adenoids, ocular defects, defects of other sense organs, diseases, handedness, speech and conditions in the home, normal children being used for comparison, was made and tabulated for large groups of children by different observers working independently. Physical and mental tests and methods of testing are carefully described. The author also attempts to determine for each patient the more important factors contributing to the retardation.

In the majority of cases the mental retardation is ascribed to a general inferiority of intellectual capacity, presumably inborn. In summarizing several large series of cases on the basis of probable etiology he concludes that 70 per cent of the

patients presented solely psychologic problems and that physical, social or scholastic factors were important in 30 per cent of the cases. Physical factors were predominant in 10 per cent of one series and in 16 per cent of another.

This book does more than describe mental retardation. Certain chapters on left-handedness and speech, for instance, express views which apply to all children. The author includes and gives due consideration to the observations of other workers throughout the world. In reading the book one cannot but be impressed with the importance of the general attitude of the writer that a child must be considered as a whole, all aspects of development being considered in the analysis of each case.

Diseases of the Nervous System in Infancy, Childhood and Adolescence. By Frank R. Ford, M.D. Price, $8.50. Pp. 953, with 107 illustrations. Springfield, Ill.: Charles C. Thomas, Publisher, 1937.

The author successfully "attempted to bring together and to analyze all available information" on diseases of the nervous system of infancy and childhood. Classifications are based on etiology, with consideration of clinical features.

The first 150 pages are devoted to nervous anatomy, emphasizing clinical syndromes and signs. There is a description of the prenatal diseases of the nervous system and an excellent detailed description of the degenerative diseases. Infections and parasitic invasions of the nervous system are divided into those due to filtrable viruses characterized by an inflammatory process involving chiefly the gray matter, bacterial infections involving the nervous system, and the toxic and metabolic disorders in which vascular demyelination is the striking feature of the pathologic picture. A chapter is devoted to vascular accidents and circulatory disorders. Neoplasms are well described, the general classification of Bailey being followed. There are a discussion of injuries to the nervous system and a chapter on disease of the muscles. Finally, there is a chapter on the more common syndromes, such as spastic paralysis, disorders of muscle tone, disorders of speech and increased intracranial pressure.

This is a valuable reference textbook on the neurology of childhood. Practically every known nervous disorder is discussed. The author has drawn freely from the literature to add to material taken from his wide experience. Throughout the book are case histories. Naturally, in a book on such a vast subject, including such a number of conditions, many cannot be fully discussed.

Feeding Behavior of Infants. By Arnold Gesel and Frances L. Ilg. Price, $4.50. Pp. 201, with 24 illustrations, 11 plates. Philadelphia: J. B. Lippincott Company, 1937.

The development of a group of healthy babies under medical supervision was observed at frequent intervals, particular attention being given to the feeding abilities and feeding reactions of each infant. These are admirably illustrated by studies made with a moving picture camera. Many of the findings are of interest. For example, the infant in the first month, if left to himself, will nurse at the breast thirty to forty minutes. As he grows older he will reduce this time one-half. Refusal of food should always be regarded as a reaction of satiety. While a few infants may take solids as early as the age of 12 weeks, most infants because of motor immaturity are unfitted for solid food before the age of 16 to 20 weeks.

The authors do not worry much about sucking of the thumb, believing that it is spontaneous and indulged in by most children. "Attempts to correct the habit before the age of 2½ years are ordinarily doomed to failure." In regard to control of the bowel and bladder, the following conclusions are reached: When the baby awakes dry from his nap it is the truest indication of his maturing ability to withold micturition. This ability is usually not established until the age of 13 to 15 months; when it develops the response to the toilet is immediate, and a previously resistant child becomes compliant.

The book is an excellent study of behavior. It gives further data, obtained by actual observation, on many problems that have perplexed the mother and doctor. It is well written, profusely illustrated with excellent photographs and well printed.

Ueber die Ernährung des Säuglings. By Dr. Hans Beumer. Second edition. Price, 2 marks. Pp. 40, with 1 illustration. Leipzig: Georg Thieme, 1937.

This book consists chiefly in the recommendation of whole lactic acid milk for use in infant feeding if breast milk is not available. The author uses a preparation called acilette put out by the manufacturing chemists Benckiser-Ludwigshafen, 1 to 100 Gm. of milk containing 2 per cent cereal and 5 per cent sugar, which is first boiled and then cooled rapidly. This is used in appropriate amounts until the eighth or ninth month, when whole unacidified milk is used. Cod liver oil and orange juice are started at the age of 2 months, vegetables at 4 months and cereals at 5 months. The author feels that such a dietary regimen results in much healthier infants than are usually found when a diluted milk mixture has been used, claiming that there is less likelihood of the development of nutritional disturbances or vitamin deficiencies.

There is considerable jumping about in the presentation of material, and there is some repetition. The opinions are said to be based on experience, but no statistics are given. In discussing the dilution of milk, the author assumes that formulas containing one-third milk and two-thirds water are commonly used. The pediatricians of this country can gain little from this book.

Mental Deficiency. By Dr. A. F. Tredgold. Sixth edition. Price, $7.50. Pp. 556, with 34 illustrations and 11 tables. Baltimore: William Wood & Company, 1937.

Since its first edition in 1908, this book has been considered authoritative. This edition is a revision and enlargement of previous editions in the light of "the great advances which have taken place in the last thirty to forty years."

The first 300 pages are devoted to a description of amentia. Its causes and frequency are discussed, and there is consideration of the specific varieties of amentia, such as the microcephalic, the mongolian and the cretin type and types due to trauma and infection. There is also a description of the degenerative diseases of the nervous system, including Schilder's disease, Wilson's disease and amaurotic family idiocy.

Moral deficiency and disorders of conduct are discussed; the author thinks they are due to lack of normal emotional growth. Chapters are devoted to psychoses, mental tests, methods of mental examination, and education and treatment of the defective child.

This edition, like the preceding one, is written in a vivid and extremely interesting style. It is an excellent reference book on all phases of mental deficiency.

Development of the Human Skeleton [Chart]. By Paul C. Hodges, Ph.D., M.D. Price, 25 cents. University of Chicago Press, 1937.

This chart pictures graphically the development of the various osseous centers. One can tell at a glance the range of the normal. It should be useful for reference.

CORRECTION

In the article by Dr. W. M. Bendien and Dr. S. van Creveld, "Investigations on Hemophilia," in the October issue (Am. J. Dis. Child. **54**:713, 1937), the percentages in the following lines are ten times too great: page 717, lines 20, 35 and 42; page 724, lines 21, 22, 23, 25 and 26, and page 725, line 8. For instance, in line 35, page 717, "3 or 4 per cent" should read "0.3 or 0.4 per cent."

Furthermore, in the summary, on page 725, line 11 should follow line 5 directly.

Directory of Pediatric Societies *

INTERNATIONAL

International Association of Preventive Pediatrics

President: Professor G. Scheltema, 6a Herreplein, Groningen, Netherlands.
Secretary: Dr. Daniel Oltramare, 15 Rue Lévrier, Geneva, Switzerland.

International Congress of Pediatrics

President: Prof. Luigi Spolverini, Policlinico Lungo Tevere Melini 24, Rome, Italy.
Secretary: Professor Vitetti, Rome, Italy.
American Committee:
Chairman: Dr. Henry F. Helmholz, Mayo Clinic, Rochester, Minn.
Secretary: Dr. L. Emmett Holt Jr., Johns Hopkins Hospital, Baltimore.
Canadian Committee:
Chairman: Dr. H. B. Cushing, 1390 Sherbrooke St., W., Montreal.
Secretary: Dr. H. P. Wright, 1509 Sherbrooke St., W., Montreal.

International Congress for the Protection of Infancy

Secretary: Prof. G. B. Allaria, Corso Bramante 29, Torino 120, Italy.

FOREIGN

British Paediatric Association

President: Dr. J. Wilkie Scott, 40 The Rope Walk, Nottingham, England.
Secretary: Dr. Arthur G. Maitland Jones, 31A Weymouth St., London, W. 1.

Paediatrický Spolok na Slovensku

President: Dr. A. J. Chura, Lazaretská 6, Bratislava, Czechoslovakia.
Secretary: Dr. S. Limbacher, Dlhá 2, Bratislava, Czechoslovakia.
Place: Pediatric Clinic, University, Bratislava. Time: Six times a year.

Royal Society of Medicine, Section for the Study of Diseases in Children

President: Dr. T. Twistington Higgins, 12 Queen Anne St., London, W. 1.
Secretary: Dr. Reginald Lightwood, 86 Brooke St., London, W. 1.
Place: 1 Wimpole St., London. Time: Fourth Friday of each month, 4:30 p. m.

Palestine Jewish Medical Association, Section of Physicians of Children's Diseases

President: Prof. S. Rosenbaum, 26 Bialikstr., Tel Aviv, Palestine.
Secretary: Dr. A. Brünn, 9 Maazestre, Tel Aviv, Palestine.

Sociedad Cubana de Pediatría

President: Prof. Félix Hurtado Galtés, Carlos III 7, Havana.
Secretary: Dr. Carlos Hernández Miyares, San Lazaro 370, Havana.
Place: Cátedra de Clínica Infantil, Hospital Mercedes, Havana. Time: Third Thursday of every month.

*Secretaries of societies are requested to furnish the information necessary to make this list complete and to keep it up to date.

NATIONAL

American Medical Association, Scientific Assembly, Section on Diseases of Children

Chairman: Dr. Clifford D. Sweet, 2940 Summit St., Oakland, Calif.
Secretary: Dr. Albert D. Kaiser, 16 N. Goodman St., Rochester, N. Y.
Place: San Francisco. Time: June 13-17, 1938.

American Academy of Pediatrics

President: Dr. Philip Van Ingen, 125 E. 71st St., New York.
Secretary: Dr. C. G. Grulee, 636 Church St., Evanston, Ill.
Region II. Place: New Orleans, La. Time: Nov. 30-Dec. 1-3, 1937.

American Hospital Association, Children's Hospital Section

Chairman: Miss Mabel Binner, Children's Memorial Hospital, Chicago.
Secretary: Winifred Culbertson, Children's Convalescent Hospital, Cincinnati.

American Pediatric Society

President: Dr. Kenneth D. Blackfan, 300 Longwood Ave., Boston.
Secretary-Treasurer: Dr. Hugh McCulloch, 325 N. Euclid St., St. Louis.
Place: The Sagamore, Bolton Landing, New York. Time: June 9-11, 1938.

Canadian Society for the Study of Diseases of Children

President: Dr. Alton Goldbloom, 1543 Crescent St., Montreal, Quebec.
Secretary-Treasurer: Dr. Pearl Summerfeldt, Hospital for Sick Children, Toronto, Ont.

Society for Pediatric Research

President: Dr. Samuel Z. Levine, 525 E. 68th St., New York.
Secretary: Dr. A. A. Weech, 3975 Broadway, New York.

SECTIONAL

North Pacific Pediatric Society

President: Frederick Fischer, 407 Riverside Ave., Spokane, Wash.
Secretary: Dr. C. L. Lyons, Paulsen Medical-Dental Bldg., Spokane, Wash.
Place: Seattle. Time: Last Saturday in January 1938.

Southern Medical Association, Section of Pediatrics

Chairman: Dr. Gilbert Levy, 20 S. Dunlap St., Memphis, Tenn.
Secretary: Dr. Hughes Kennedy Jr., Highland Plaza Apts., Birmingham, Ala.
Place: New Orleans. Time: Nov. 30-Dec. 3, 1937.

STATE

Alabama Pediatric Society

President: Dr. J. H. Baumhauer, 56 St. Joseph St., Mobile.
Secretary-Treasurer: Dr. M. Vaun Adams, 803 Government St., Mobile.
Place: Mobile. Time: Third Monday in April 1938.

Arkansas State Pediatric Association

Chairman: Dr. E. C. McMullen, 500 Main St., Pine Bluff.
Secretary: Dr. Madeline M. Melson, 909 Main St., Little Rock.
Place: Texarkana, Ark. Time: February 1938.

California State Medical Society, Section on Pediatrics

Chairman: Dr. E. Earl Moody, 3780 Wilshire Blvd., Los Angeles.
Secretary: Dr. Hartzel H. Ray, 23-2d Ave., San Mateo.
Place: Pasadena. Time: May 9-12, 1938.

Florida State Pediatric Society

President: Dr. Douglas D. Martin, 442 W. Lafayette St., Tampa.
Secretary: Dr. Warren W. Quillian, 227 Avenue Aragon, Coral Gables.
Place: Concurrent with state association meeting at time of convention.

Georgia Pediatric Society

President: Dr. Roger W. Dickson, 33 Ponce de Leon Ave., N. E., Atlanta.
Secretary-Treasurer: Dr. Don F. Cathcart, 478 Peachtree St., N. E., Atlanta.
Place: Augusta. Time: April 1938.

Hezekiah Beardsley Pediatric Club of Connecticut

President: Dr. J. Harold Root, 103 N. Main St., Waterbury.
Secretary: Dr. Joseph L. Hetzel, 103 N. Main St., Waterbury.
Time: Three meetings a year.

Indiana State Pediatric Society

President: Dr. Ernest R. Carlo, 2902 Fairfield Ave., Fort Wayne.
Secretary-Treasurer: Dr. Mathew Winters, 23 E. Ohio St., Indianapolis.
Time: Two meetings a year.

Louisiana State Pediatric Society

President: Dr. Clarence H. Webb, 624 Travis St., Shreveport.
Secretary-Treasurer: Dr. Ruth Aleman, 1407 S. Carrollton Ave., New Orleans.
Place: New Orleans. Time: April 25-27, 1938.

Medical Society of State of New York, Section on Pediatrics

Chairman: Dr. John D. Craig, 33 E. 61st St., New York.
Secretary: Dr. Norman L. Hawkins, 11 Public Sq., Watertown, N. Y.
Place: New York. Time: May 9-12, 1938.

Michigan State Medical Society, Pediatric Section

Chairman: Dr. C. R. Dengler, 131 W. Michigan Ave., Jackson.
Secretary: Dr. Ward Chadwick, 524 Medical Arts Bldg., Grand Rapids.

Mississippi State Pediatric Society

President: Dr. Guy C. Jarratt, 920 Cawford St., Vicksburg.
Secretary-Treasurer: Dr. Harvey F. Garrison Jr., 315 E. Capitol Pl., Jackson.
Place: To be designated by Society. Time: Yearly.

Nebraska Pediatric Society

President: Dr. J. A. Henske, 1614 Medical Arts Bldg., Omaha.
Secretary-Treasurer: Dr. J. H. Murphy, 915 Medical Arts Bldg., Omaha.
Place: As announced by committee. Time: Third Thursday of each month from October to June, inclusive. Dinner at 6 p. m.

North Carolina Pediatric Society

President: Dr. John LaBruce Ward, Arcade Bldg., Asheville.
Secretary: Dr. Lewis Elias, 36 Grove St., Asheville.

Oklahoma State Pediatric Society

President: Dr. A. L. Salomon, 1200 N. Walker St., Oklahoma City.
Secretary: Dr. Ben H. Nicholson, 301 W. 12th St., Oklahoma City.

Pennsylvania Medical Society, Pediatric Section

Chairman: Dr. Theodore O. Elterich, 3700-5th Ave., Pittsburgh.
Secretary: Dr. John M. Higgins, 600 S. Wilbur Ave., Sayre.

South Carolina Pediatric Society

President: Dr. Leland B. Salters, 317 S. Warley St., Florence.
Secretary-Treasurer: Dr. D. Lesesne Smith Jr., 187 Oakland Ave., Spartanburg.

Tennessee State Pediatric Society

President: Dr. Eugene Rosamond, 1074 Madison Ave., Memphis.
Secretary: Dr. Kinsey M. Buck, 1193 Madison Ave., Memphis.
Place: Nashville. Time: April 12-14, 1938.

Texas Pediatric Society

President: Dr. John G. Young, 3930 McKinney Ave., Dallas.
Secretary-Treasurer: Dr. F. H. Lancaster, 4409 Fannin St., Houston.
Place: Galveston. Time: May 10-12, 1938.

Virginia Pediatric Society

President: Dr. W. Ambrose McGee, 616 W. Grace St., Richmond.
Secretary: Dr. John M. Bishop, Medical Arts Bldg., Roanoke.
Place: Danville, Va. Time: October 1938.

West Virginia State Medical Society, Section on Pediatrics

President: Dr. Claude L. Holland, 400 Locust Ave., Fairmont.
Secretary: Dr. Theresa O. Snaith, Weston.

LOCAL

Academy of Medicine of Cleveland, Pediatric Section

Chairman: Dr. William M. Champion, 2323 Prospect Ave., Cleveland.
Secretary: Dr. Arthur J. Horesh, 10515 Carnegie Ave., Cleveland.
Place: Cleveland Medical Library Bldg. Time: October, December, February and April.

Academy of Medicine, Toronto, Section of Pediatrics

President: Dr. T. B. Verner, 170 St. George St., Toronto.
Secretary: Dr. D. V. Hutton, 170 St. George St., Toronto.

Bronx Pediatric Society

President: Dr. Daniel J. Dolan, 420 E. 159th St., New York.
Secretary: Dr. Samuel T. Levethan, 254 E. 184th St., New York.
Place: Concourse Plaza Hotel, 161st St. and Grand Concourse. Time: Every second Wednesday of each month, except June, July, August and September.

Brooklyn Academy of Pediatrics

President: Dr. Walter D. Ludlum, 1421 Cortelyou Rd., Brooklyn.
Secretary: Dr. John A. Monfort, 861 Carroll St., Brooklyn.
Place: Kings County Medical Society Bldg. Time: Fourth Wednesday of each month, except May, June, July, August and September.

Central New York Pediatric Club

President: Dr. Frank Vasder Bogert, 111 Union St., Schenectady.
Secretary: Dr. Frank J. Williams, 58 S. Swan St., Albany.
Place: Various cities in New York. Time: Third Thursday of April and September.

Chicago Pediatric Society

President: Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.
Secretary: Dr. George F. Munns, 723 Elm St., Winnetka, Ill.
Place: Children's Memorial Hospital, 710 Fullerton Ave., Chicago. Time: Third Tuesday of each month, October to May, inclusive.

Dallas Pediatric Society

President: Dr. John Young, 3930 McKinney Ave., Dallas, Texas.
Secretary-Treasurer: Dr. John E. Ashby, 3622 Fairmont Ave., Dallas, Texas.
Place: Bradford Baby Hospital. Time: 1 p. m., second and fourth Saturdays of each month.

Detroit Pediatric Society

President: Dr. W. J. Scott, 5140–2d Ave., Detroit.
Secretary: Dr. Harold E. Clark, 100 Atkinson Ave., Detroit.
Place: Wayne County Medical Society. Time: 8:30 p. m., first Wednesday of each month from October to June, inclusive.

Fulton County Medical Society, Pediatric Section (Atlanta, Ga.)

Chairman: Dr. T. F. Davenport, 104 Ponce de Leon Ave., Atlanta.
Secretary: Dr. James P. Hanner, 384 Peachtree St., Atlanta.
Place: Academy of Medicine, 38 Prescott St., N. E. Time: Second Thursday of each month from October to April, 8 p. m.

Houston Pediatric Society

President: Dr. Walter F. Qualtrough, 920 Westheimer Ave., Houston, Texas.
Secretary-Treasurer: Dr. Allan Penny Bloxsom, 4402 Travis St., Houston, Texas.
Place: Houston Club. Time: Third Monday of each month.

Intermountain Pediatric Society

President: Dr. Eugene Smith, 385—24th St., Ogden, Utah.
Secretary-Treasurer: Dr. W. C. Cheney, 1020 Boston Bldg., Salt Lake City, Utah.
Place: Salt Lake City, General Hospital. Time: First Thursday of each month, 8 p. m.

Kansas City (Missouri) Pediatric Society

President: Dr. W. R. Moore, 620 Francis St., St. Joseph.
Secretary: Dr. F. S. Hogue, 1103 Grand Ave., Kansas City.
Place: Kansas City General Hospital. Time: On call.

Los Angeles County Medical Association, Pediatric Section

President: Dr. Edwin F. Patton, 3875 Wilshire Blvd., Los Angeles.
Secretary-Treasurer: Dr. Henry F. Gallagher, 1930 Wilshire Blvd., Los Angeles.
Place: Los Angeles County Medical Headquarters, 1925 Wilshire Blvd.
Time: Second Monday of February, April, June, October and December.

Medical Society of the County of Kings and the Academy of Medicine of Brooklyn, Pediatric Section

President: Dr. Harry R. Litchfield, 163 Eastern Parkway, Brooklyn.
Secretary: Dr. Jacob Rosenblum, 550 Ocean Ave., Brooklyn.
Place: 1313 Bedford Ave., Brooklyn. Time: Third Wednesday of each month, October to May.

Medical Society of the County of Queens, Inc., Section on Pediatrics

Chairman: Dr. W. C. A. Steffen, 42 Union St., Flushing, N. Y.
Secretary-Treasurer: Dr. Edith A. Mittell, 144–38th Ave., Flushing, N. Y.
Place: Queens County Medical Bldg., Forest Hills, N. Y. Time: Third Monday of October, January, March and May.

Memphis Pediatric Society

President: Dr. Clyde V. Croswell, 1052 Madison Ave., Memphis, Tenn.
Secretary-Treasurer: Dr. David W. Goltman, 1073 Madison Ave., Memphis, Tenn
Place: John Gaston Hospital. Time: Quarterly.

Milwaukee Pediatric Society

President: Dr. George F. Kelly, 425 E. Wisconsin St., Milwaukee.
Secretary: Dr. Helen Jane Zilmer, 781 N. Jefferson St., Milwaukee.
Place: Children's Hospital. Time: Second Wednesday of each alternate month, beginning with February.

New England Pediatric Society

President: Dr. Henry E. Utter, 122 Waterman St., Providence, R. I.
Secretary-Treasurer: Dr. Henry E. Gallup, 1101 Beacon St., Brookline, Mass.
Place: Boston Medical Library. Time: Four meeting a year, occurring from September to May.

New York Academy of Medicine, Section of Pediatrics

Chairman: Dr. Samuel Z. Levine, 525 E. 68th St., New York.
Secretary: Dr. Philip M. Stimson, 25 Claremont Ave., New York.
Place: New York Academy of Medicine, 2 E. 103d St. Time: Second Thursday of each month from October to May, inclusive, 8:30 p. m.

Northwestern Pediatric Society

President: Dr. Roger L. J. Kennedy, Mayo Clinic, Rochester, Minn.
Secretary-Treasurer: Dr. Robert Rosenthal, 437 Lowry Medical Arts Bldg., St. Paul.
Place: Minneapolis, St. Paul, Duluth and Rochester. Time: January, April, July and October.

Oklahoma City Pediatric Society

President: Dr. A. L. Salomon, 1200 N. Walker St., Oklahoma City.
Secretary: Dr. G. R. Felts, 1200 N. Walker St., Oklahoma City.
Time: Alternate months.

Philadelphia Pediatric Society

President: Dr. Emily Bacon, 2104 Spruce St., Philadelphia.
Secretary: Dr. James E. Bowman, 4091 Comly St., Philadelphia.
Place: College of Physicians, 19 S. 22d St. Time: Second Tuesday of each month from October to June, inclusive.

Pittsburgh Pediatric Society

President: Dr. James LeRoy Foster, Highland Bldg., Pittsburgh.
Secretary-Treasurer: Dr. E. R. McClusky, 3200–5th Ave., Pittsburgh.
Place: Pittsburgh Academy of Medicine. Time: Second Friday, alternate months from October to April, inclusive.

Richmond Pediatric Society

President: Dr. Lee E. Sutton Jr., 2601 Grove Ave., Richmond, Va.
Secretary-Treasurer: Dr. Louise Fry Galvin, 2416 Stuart Ave., Richmond, Va.
Place: Richmond Academy of Medicine, 1200 E. Clay St. Time: First Thursday of each month (except July, August and September).

Rochester Pediatric Society

President: Dr. J. Merrel Parker, 11 N. Goodman St., Rochester, N. Y.
Secretary: Dr. H. C. Soule, 16 N. Goodman St., Rochester, N. Y.
Place: Arranged by program committee. Time: Second Friday of each month.

Rocky Mountain Pediatric Society

President: Dr. James E. Russell Jr., 820 Metropolitan Bldg., Denver.
Secretary: Dr. F. Craig Johnson, 1850 Gilpin St., Denver.
Place: Children's Hospital, Denver. Time: First Saturday of each month from September to May, inclusive, 2:30 p. m.

St. Louis Pediatric Society

President: Dr. John Zahorsky, 536 N. Taylor Ave., St. Louis.
Secretary-Treasurer: Dr. Max Deutch, 634 N. Grand Blvd., St. Louis.
Place: St. Louis Medical Society. Time: Third Friday of every month.

Seattle Pediatric Society

President: Dr. Frank H. Douglass, Medical Dental Bldg., Seattle.
Secretary: Dr. C. Luverne Smith, Stimson Bldg., Seattle.
Place: College Club. Time: Third Friday of each month, 6:30 p. m.

Southwestern Pediatric Society

President: Dr. Louis M. Earle, 6381 Hollywood Blvd., Los Angeles.
Secretary: Dr. Philip E. Rothman, 3875 Wilshire Blvd., Los Angeles.
Place: University Club of Los Angeles. Time: First Wednesday in January, March, May, September and November.

University of Michigan Pediatric and Infectious Disease Society

President: Dr. Damon O. Walthall, 1103 Grand Ave., Kansas City, Mo.
Secretary: Dr. D. Murray Cowie, University of Michigan, Ann Arbor, Mich.

Westchester County Medical Society, Pediatric Section (New York)

President: Dr. R. A. Higgons, 264 King St., Port Chester, N. Y.
Secretary-Treasurer: Dr. Elvira Ostlund, 131 Purchase St., Rye, N. Y.
Place: Grasslands Hospital. Time: Third Thursday, October, December, February and April.

INDEX TO VOLUME 54

The asterisk (*) preceding the page number indicates an original article. Subject entries are made for all articles. Author entries are made for original articles and society transactions. Book Reviews, Obituaries and Society Transactions are indexed under the letters B, O and S, respectively.

Abdomen, Lymph Nodes: See Lymph Nodes
pain in children; gastric syndromes, 406, 1392
surgery, 666, 1415
Abelson, S. M.: Macroglossia in children; review of literature; report of case of true muscular hypertrophy; classification, *1328
Abnormalities and Deformities: See also Monsters; Twins; and under names of diseases, organs and regions, as Anus, imperforate; Esophagus, atresia; Fingers and Toes, abnormalities; Foot, deformities; Heart, abnormalities; Heart, displacement; Microcephaly; etc.
congenital deformities of mechanical origin, 363
marriage health law and congenital body deformities, 861
microcephalic fetus without eyes and nose and with serious defects of forebrain, cerebellum, inner ear and endocrine glands, 861
physical deformities commonly regarded as due to rickets, 927
Abortion, probable rôle of attempts at abortion in physical and mental retardation, 182
Abscess: See also under names of organs and regions, as Brain, abscess; Liver, abscess; Lungs, abscess; etc.
Brodie's: See Radius, abscess
peritonsillar; abscess tonsillectomy in diabetes, 925
peritonsillar, and tonsillectomy, 396
peritonsillar; prevention of tonsillogenic sepsis by abscess tonsillectomy, 624
retropharyngeal, 892
retropharyngeal, in infant complicated by pneumonia and osteomyelitis, with recovery, 138
Abt, A. F.: Cevitamic acid content of blood plasma, 682
Acalculia; congenital arithmetic disability and acalculia (Henschen), 915
Acardia: See under Heart
Accidents; "accidental" self-injury in children, 913
Acetone in Blood: See Blood, ketone bodies
in Urine: See under Diabetes Mellitus; Urine, ketone bodies
Achondroplasia, chondrodystrophies, 433
chondro-osteodystrophy, corneal opacities, hepatosplenomegaly and mental deficiency; gargoylism, 601
congenital chondrodystrophy; report of case, 927
dysostosis enchondralis, 656
Achylia Gastrica: See Stomach, achylia
Acid, acetic; effect on intestinal motility, 1394
Acetylsalicylic: See under Salicyl Compounds
Ascorbic (Cevitamic): See Scurvy; Vitamins, C
Cevitamic: See Scurvy; Vitamins, C
Mandelic: See Urinary Tract, infections
Acidosis and alkalosis in children, 183
associated with administration of para-aminobenzenesulfonamide (sulfanilamide), 1416
in Diabetes: See under Diabetes Mellitus
in unfamiliar rachitic syndrome, 1186
persistent in infant; cause not ascertained, 358
Acridine dyes; atabrine, toxicity of; myeloradicular neuritis after ingestion of atabrine, 1398
Acrocephaly; acrocephalosyndactylism in newborn; report of case, 1356
oxycephalus; premature synostosis of cranial sutures, 1355
Acrodynia, geographic distribution of, 175
infantile, with fibrillary chorea of Morvan and psychic disturbances, 151
racial incidence of, 1167
Acromegaly, calcium and phosphorus metabolism in 3 cases of, 427
Actinomycosis, pulmonary, 383, 610
Acupuncture: See under Asthma
Adams-Stokes' Disease: See Heart, block
Addison's disease in child, 430
Adenitis: See under Lymph Nodes
Adenoidectomy, relation to onset of poliomyelitis, *998
Adenoids, physiology; is lymphatic tissue in nasopharynx protection against infection? 1386
Adenoma; therapy for tumor of hypophysis, 923
Adenopathy: See under Lymph Nodes
Adipose Tissue: See Lipoma; Obesity
Adiposogenital Syndrome: See Laurence-Biedl Syndrome
Adolescence, difficulty in bringing up child in period of maturity, 1403
enlargement of mammary gland in normal adolescent male, 355
hypophysis and prepubertal period, 922
precocious genital development of postencephalitic origin, 430
precocious puberty and macrogenitosomia praecox; Pellizzi's syndrome, 1405
precocious puberty in osteodystrophia fibrosa, *806
precocious puberty; metabolism of creatine in pubertas praecox, 919
strain of school life on girls during early menstrual period, 915
Adoptions, new system in Uruguay, 942
Adrenals; adrenal cortex, relation to vitamin C, 855
adrenal cortical syndrome in patient with tumor of accessory adrenal gland, 430
adrenalectomy in rats; hepatic glycogen after operation, 430
hemorrhage; fulminating septicemia associated with purpura and bilateral adrenal hemorrhage (Waterhouse-Friderichsen syndrome); report of 2 cases; review of literature, 1115
insufficiency and salt and water metabolism of rats, 921
lactation in adrenalectomized rats, 99
neuroblastoma of adrenal medulla, 958
neurocytoma of adrenal body, with secondary growths causing blindness, 957
preparations; action of hormone of adrenal cortex on diphtheric intoxication, 1110
response to injuries and intoxications, 163
tumor in child, 926
tumor; neuroblastoma in children; report of 2 cases, 1406
tumor of accessory adrenal gland in patient with adrenal cortical syndrome, 430
virilism, 424
Advisory Board for Medical Specialties, annual meeting, 96
Agar: See under Dyspepsia
Age, roentgenographic estimation of age for medicolegal purposes, 943
Agranulocytosis: See Angina, agranulocytic
Albinism and unialbinism in twin African Negroes, *786
Albright, F.: Rickets resistant to vitamin D therapy, *529
Albumin: See Albuminuria; Blood, proteins; Protein
Albuminuria in childhood, 649
Alcoholism; effect of oxygen inhalation on course of acute alcoholic intoxication, 440
Aldrich and McClure Test: See under Edema
Alexander, H. E.: Comparison of response to antiserums in human and mouse meningococcic infections, 1175
Alimentary Tract: See Gastro-Intestinal Tract

Alkalosis and acidosis in children, 183
Allergy: See Anaphylaxis and Allergy; Asthma; Food, allergy; Hay Fever; etc.
Altitude, advantages of moderately high altitude for childhood diseases, 1086
Amentia: See Feeblemindedness; Idiocy; Insanity; etc.
American Board of Pediatrics, examinations of, 354
  physicians certified by, 96, 1197
p-Aminobenzenesulfonamide: See Sulfanilamide and Sulfanilamide Derivatives
Aminopyrine; agranulocytosis and susceptibility to pyramidon, 1381
  allergy to aminopyrine; blood studies after anaphylactic-like shock, 1413
Ammonia in Urine: See Urine, ammonia
Amyloidosis; congo red in diagnosis of amyloid disease of kidneys, 161
Amyoplasia Congenita: See Joints, ankylosis; Muscles, abnormalities
Anaphylaxis and Allergy: See also Arthus Phenomenon; Asthma; Food, allergy; Hay Fever; etc.
  Alimentary: See Food, allergy
  allergic basis of primary purpura in children, 136
  allergic shock, 935
  allergy as related to otolaryngology, 891
  allergy as related to otolaryngology and ophthalmology; literature for 1936, 1412
  allergy of eye, ear, nose and throat, 1136
  allergy to liver extract, 665
  alum as adjuvant in sensitizing guinea-pigs to ragweed pollen, 935
  blister fluid in passive transfer skin test, 438
  constitutional anomalies, 1097
  human passive transfer antibody; neutralization of antigen, *777
  human passive transfer antibody; titration by neutralization, *288
  intelligence rating of allergic child, 1152
  prophylaxis in allergic diseases, 174
  tests; mutual absorption tests with related foods, 1411
  treatment of allergy with calcium, 663
  treatment with blood serum irradiated with ultraviolet rays, 1093
  types of allergy that are little recognized, 1168
  vitamin C and anaphylactic shock, 598
Ancylostomiasis: See Hookworm Infestation
Anderson, L. R.: Human convalescent serum in prevention and modification of measles, *277
  Prophylactic and therapeutic use of scarlet fever convalescent serum, *504
Andrews, E. T.: Lobar pneumonia in children; differentiation of recovered pneumococci into etiologic groups; familial distribution, *1285
Anemia, Agranulocytic: See Angina, agranulocytic
  anaemia neonatorum; report of case, 865
  and jaundice with recovery in successive newborn siblings, 863
  aplastic, 612
  aplastic, primary, in infant; report of case, 1423
  aplastic; report of case, 137
  chemical nature of antianemic principle, 132
  Cooley's: See Pseudoleukemia, infantile
  diagnosis and treatment in infancy, 1132
  Erythroblastic: See also Pseudoleukemia, infantile
  erythroblastic; similarity to chronic or congenital malaria; successful treatment of 8 patients with quinine, *60
  febrile, of obscure origin, 888
  hemolytic, congenital, 1378
  hemolytic, unusual case of, 187
  hypochromic, myxedema and hypercholesteremia in child, 428
  hypochromic; preparation of ferrous gluconate in treatment of hypochromic anemia in rats, 1377
  maturation of red cells and, 953
  nitrogen metabolism during regeneration of blood, 881
  nutritional, in East End of London, 1133
  nutritional; management in infancy, 616
Anemia—Continued
  nutritional, of infants; treatment, 135
  of new-born, 865
  of new-born; erythrophagocytosis in 2 cases, 1191
  physiologic and nutritional anemia in infants; iron-cobalt treatment, 186
  problem in Southern Rhodesia, 136
  profound; chronic arsenic poisoning associated with profound anemia and scleroderma in child, 942
  pseudopernicious, and intestinal infantilism, 410
  secondary, ultraviolet irradiation for, 134
  sickle cell, as cause of cerebral vascular disease, 614
  sickle cell, changes in vessels and bones in, *1045
  sicklemia in Southwest, 134
  splenic; Gaucher's disease, 390
  therapy; effect of various supplements to diet on iron balance of anemic infant, 1377
  therapy; increase in reticulocytes after injection of "anemic serum," 392
  with pigmentation of skin and collapsed lower lobe of left lung, 611
Anesthesia, chloroform, liver preparation protecting against necrosis from, 670
  intravenous, suggestions to facilitate venipuncture in, 1417
  peridural (epidural), in children with reference to cystoscopy, 938
  spinal, for poor pediatric surgical risks, 439
  tribromethanol in amylene hydrate as narcotic for children, 668
  tribromethanol; use of avertin for production of basal narcosis in children, 176
Aneutrophia, physiology of, 103
Angina: See also Abscess, peritonsillar; Tonsils
  acute in children; cure by bismuth; method of Monteiro, 396
  agranulocytic, and allergy to aminopyrine; blood studies after anaphylactic-like shock, 1413
  agranulocytic; case of healed agranulocytosis in infancy, 620
  agranulocytosis and susceptibility to pyramidon, 1381
  Vincent's, followed by scleredema adultorum (Buschke); involvement of muscles in 11 year old boy, *322
  Vincent's stomatitis as cause of obscure fever, 1391
  Vincent's; treatment with acetarsone, 139
Angioma, cerebral; importance of cerebral angiography in diagnosis, 637
  flat hemangioma of face treated by freezing, 935
  hemangioma, calcified, intracranial; case of epilepsy combined with hemangioma, 155
  hemangioma causing unusual extracardiac murmur simulating organic heart disease, 615
  Lindau's disease; von Hippel's disease, 932
  lymphangioma in orbit, 169
  multiple hereditary hemangioblastomas of nervous system, 634
  of left brachium pontis, with associated aneurysmal varices, 1147
  of orbit simulated by retention cyst of unusual size, probably of Krause's gland, 657
  simple treatment of, 1169
Animals; diseases transferable to man from domestic animals, 1417
Anisocoria: See under Pupils
Ankylosis: See Joints; etc.
Anomalies: See Abnormalities and Deformities; and under names of organs and regions
Anorexia, child psychology in, 1153
Anthropometry: See under Body; Growth; etc.
Antibodies: See Antigens and Antibodies
Antigens and Antibodies; human passive transfer antibody; neutralization of antigen, *777
  human passive transfer antibody; titration by neutralization, *288
  passive transfer antibody; fluctuations of titer in treated and untreated hay fever, 1181
  production of heterophile antigen by certain bacteria and plants, 850

Antrum; antrostomy with use of drainage tubes in children; 15 years' experience, 621
Anus, imperforate, 1143
imperforate, with perineoscrotal fistula, 603
imperforate, with rectovaginal cloaca, 600
Aorta, abnormalities causing congenital heart disease, 617
atresia, congenital; case report, 389
coarctation; report of 2 unusual cases, 1379
course of aorta in children; mensurability, 885
double aortic arch in man, 614
Aphasia in girl 4 years old, 156
Aphthae: See Stomatitis
Apnea attacks in infants, 1140
paroxysms with cyanosis in new-born with intracranial hemorrhage, 1358
Appendicitis, acute, and measles, 869
acute, causing abdominal pain in juvenile diabetes mellitus, 162
acute, early diagnosis of, 403
acute, in children, 404
caused by Ascaris and Trichocephalus, 147
chronic, and megacolon in children, 1146
chronic, and ulcer of duodenum in 9 year old child, 1145
diagnosis of; abdominal pain in childhood, 1392
in childhood, 407
in early childhood, 408
oxyuris vermicularis and, 402
simulated by perforated duodenal ulcer in 9 year old girl, 1394
Appendix, absence of, congenital, in patient with mental disease, 630
rupture of, in children; management, 176
symptoms in acute infectious diseases, 118
Appetite; self-selection of diets by rats, 1180
Apples; clinical study of apple diet in treatment of diarrhea in infants, 629
powder in intestinal disorders; simplification and improvement on Heisler-Moro raw apple diet, 1391
raw apple diet and pectin-agar mixtures in pediatric diarrheas, 1142
raw apple treatment of infantile diarrhea, 405
Aqueduct of Sylvius: See under Brain
Arachnodactylia: See Fingers and Toes, abnormalities
Arachnoid; specific epileptic syndrome relieved by lysis of pacchionian granulations; 3 cases, 633
Arena, J. M.: Results of blood transfusions in primary pneumonia in infants and children, *23
Argyria: See Silver, toxicity
Arhinencephalia: See under Brain
Arithmetic: See Mathematics
Arms: See also Extremities; Humerus; etc.
brachial monoplegia, 152
congenital muscular hypertrophy of, 168
Arnold, D. P.: Dystrophy of liver in infancy and childhood, 948
Arrhythmia: See also Heart, block; Heart, rate
gallop rhythm and physiologic third heart sound, 136
sinus; electrocardiographic studies of cardiac function in diphtheria, 1109
Arsenic poisoning, chronic, in child and associated with profound anemia and scleroderma, 942
poisoning, outbreak of, 180
Art; unusual artistic ability in child, 156
Arteries: See also Aorta; etc.
cerebral; fate of thorium dioxide (thorotrast) in cerebral arteriography, 1379
pulmonary; bowing of artery in children with normal hearts, 621
pulmonary; case of diffuse dilatation of pulmonary artery due to congenital insufficiency of pulmonary valve, 1134
Arteriosclerosis in young diabetic patients; recognition by measurement of arterial elasticity, 419
Arthritis causing subacute and chronic diseases of knee joint in childhood, 1163
chronic, 1410
deformans; Still's disease with nodules, 930
due to staphylococcic sepsis in children, 878
gonococcic, in mother and new-born, 366
Arthritis—Continued
meningococcic, suppurative, of cryptogenic origin, 123
polyarthritis chronica leukocytotica (Still) and lymphocytotica (Rhonheimer), secondary zonular opacity of cornea in, 167
treatment by hydrotherapy, 166
Arthus phenomenon in oropharyngeal mucosa, 97
Ascariasis and high eosinophilia; report of case, 380
enterocolitis and appendicitis caused by, 147
persistent and massive, associated with anemia and eosinophilia in child 18 months old, 123
roentgen diagnosis of A. lumbricoides in human alimentary tract, 878
Asphyxia neonatorum; gases in umbilical blood, 890
pharyngeal, in 4 year old girl with exophthalmic goiter, 429
Aspirin: See under Salicyl Compounds
Asthma: See also Anaphylaxis and Allergy
blood sugar studies in, 895
bronchial, rôle of house dust in, 1387
due to food allergy; roentgen studies of children with alimentary disturbances, *1239
due to house dust, 1412
lipids of blood plasma in, 1411
nose and throat in 500 cases of asthma, 895
perennial; house dust hypersensitivity in childhood, 663
problem of asthmatic child, 173
reactions to intracutaneous injections of nucleoproteins of pathogenic bacteria from upper respiratory tract in asthmatic patients, 894
severe, roentgen treatment of, 626
status asthmaticus; report of 16 cases, 1412
treatment, 664
treatment by acupuncture, 897
vaccine treatment in childhood, 1387
Astrocytoma; glioma of aqueduct of Sylvius, 903
Atabrine: See Acridine Dyes
Ataxia, cerebellar; forms of familial ataxia resembling multiple sclerosis; clinical study, 1395
Friedreich's: See Ataxia, hereditary
hereditary; forms of familial ataxia resembling multiple sclerosis; clinical study, 1395
Atelectasis: See Lungs, collapse
Athetosis; choreo-athetosis in progressive unilateral rigidity with torsion spasms about longitudinal axis, 638
Athletics and heart; electrocardiographic and roentgen study of response of healthy and diseased hearts to exercise, 1379
eyes and sport, 934
sport and nutrition, 854
Athrepsia: See under Nutrition
Atlee, E. D.: Massive congenital diaphragmatic hernia, 1419
Atrophy: See also under names of organs and regions
Muscular: See also Dystrophy, muscular
muscular, progressive, differentiated from pseudomyopathic polyneuritis, 906
muscular, progressive; muscular function in muscular atrophy, 930
muscular; "simple disuse atrophy" in monkey, 927
Austria, infant mortality in, 363
Autohemotherapy; Autoserotherapy: See Serotherapy and Hemotherapy
Avertin: See Anesthesia, tribromethanol
Avitaminosis: See under Deficiency Diseases; Vitamins; and under names of deficiency diseases, as Beriberi; Scurvy; etc.
Azotemia: See under Blood

Bacal, H. L.: Osteomyelitis of superior maxilla in new-born, 954
Bacilli: See Bacteria
Backward Children: See Nervous and Mental Disabilities
Bacteremia: See under Diphtheria; Pneumococci; Septicemia; Streptococci; Tuberculosis; etc.

Bacteria: See also Diphtheria, bacilli; Pneumococci; Tubercle Bacilli; etc.
abortus and melitense group, causing blastoma of adrenals, 921
abortus and melitense group; successful treatment of brucella meningitis with immune human serum; isolation of organism by modified cultural method, 876
acidophilus; influence of dried fruits and absorbing agents on intestinal flora of white rats, 1391
anaerobic, rôle in acute diarrhea of infants, 1392
Bordet-Gengou's: See Whooping Cough
coli and catatonia due to pyelitis, 419
coli and treatment of pyuria in children, 919
coli causing congenital icterus gravis, 605
coli causing numerous cases of diarrhea in infants, 407
coli-mutabile from outbreak of diarrhea in new-born, 862
Corynebacteria: See also under Diphtheria
corynebacteria; types in Capetown, 1362
corynebacteria: types of C. diphtheriae, 118
Diphtheria: See under Diphtheria
Dysentery: See Dysentery
flora in children's hair, 1414
Friedländer's: See Bacteria, mucosus capsulatus group
injected directly into cecal end of colon, fate of, 144
Meningococci: See Meningococci
mucosus capsulatus group; mixed infection of meninges with Koch's bacillus and Friedländer's pneumobacillus, 1151
permeability of placenta for various microorganisms, 672
Pertussis: See Whooping Cough
pyocyaneus, systemic infection with: review of literature: report of 7 cases, 610
Salmonella: See Salmonella
Shiga's: See Dysentery
Streptococci: See Streptococci
Suipestifer: See under Salmonella
Tuberculosis: See Tubercle Bacilli
Typhoid Group: See also Salmonella: Typhoid; etc.
typhoid group, Brodie's abscess of radius due to, 432
Bacteriophage, permeability of placenta for, 672
Bakwin, H.: Pathogenesis of tetany of newborn, *1211
Ballon, H. C.: Chemotherapy (sulfanilamide) in treatment of streptococcic infections of lung, pleura and chest wall, 951
Bamberger-Marie Disease: See Osteo-Arthropathy, hypertrophic, pulmonary
Bananas, anaphylaxis from, 1168
treatment of acute diarrheal disorders with banana and banana powder, 1143
treatment of diarrheal diseases, 404
treatment of infantile diarrhea, 901
Bantus: See Negroes
Barbital and Barbital Derivatives; anticomplementary and anticoagulant action of barbiturates, 1080
phenobarbital poisoning, 669
Bardet-Laurence-Biedl Syndrome: See Laurence-Biedl Syndrome
Barelare, B.: Self-selection of diets by rats, 1180
Barium in drinking water; relation to endemic goiter, 424
Batavia; carotene and vitamin A contents of Batavian mother's milk, 592
vitamin C content of Batavian mother's milk, 593
B C G Vaccine: See under Tuberculosis
Behavior, aggressive-submissive, and Fröhlich syndrome, 642
control, mechanism and evolution of, 416
culture of sexual etiquette in youth, 1403
disorders; children's hospital for neurologic and behavior disorders, 642
meaning of children's habits, 912
problems, trends in child psychiatry, 1152
relation of increased vitamin B_1 intake to mental and physical growth of infants, *750
Bejel: See under Syphilis
Bendien, W. M.: Investigations on hemophilia, *713
Benzedrine, Therapy: See under Nose
Beriberi; blood sugar in infantile beriberi, 1093
capillary blood pressure in infantile beriberi, 1093
treatment with crystalline antineuritic vitamin, 104
vitamin B_1 therapy of, 1087
Bernstein, S. S.: Lipid partition of erythrocyte stroma, 1192
Besnier-Boeck's Disease: See Sarcoid
Bezoars: See Stomach, foreign bodies
Biedl-Laurence Syndrome: See Laurence-Biedl Syndrome
Biemond Syndrome: See Laurence-Biedl Syndrome
Bigler, J. A.: Cryptorchidism treated with gonadotropic hormones, 190
Bile; action of dry bile obtained with various solvents on Str. erysipelatis in vitro, 1346
ducts, atresia, congenital, causing biliary cirrhosis of liver; report of case, 409
ducts, stenosis of, 902
origin of fecal fat in absence of bile; studied with deuterium as indicator, 898
Biliary Tract; biliary cirrhosis with cyanosis and finger-clubbing, 900
obstruction resulting from hemorrhage in newborn; report of case with necropsy, *1052
Birth, Injuries: See under New-Born Infants
Rate: See under Vital Statistics
Bismarsen therapy causing fatality, 126
Bites: See under Gnats; Spiders; etc.
Black, R. A.: Cryptococcic bronchopneumonia, *81
Bladder, calculi; occurrence of citric acid in vesical calculi of rats, 1405
calculi; vesical lithiasis, 1405
exstrophy, 1404
exstrophy; ectopia vesicae treated by implanting ureters into bowel, 1155
exstrophy treated by prerectal pelvic transposition of bladder, 648
inflammation; pyelo-ureterocystitis in early infancy associated with malformations of urinary tract, 1155
peridural (epidural) anesthesia in children with reference to cystoscopy, 938
sympathetic innervation of external sphincter of human bladder, *1012
Blindness, congenital; case of bilateral pseudoglioma, 435
familial form of retinitis pigmentosa with blindness and obesity of cerebral origin; first anatomic observation, 657
peculiar case of, 957
prevention of, and modern treatment of squint, 1165
Blister fluid used for passive transfer skin test, 438
Block, L.: Peptic ulcer in children, 687
Blood: See also Anemia; Erythrocytes; Hemoglobin; Leukemia; Leukocytes; under names of diseases; etc.
Acetone Bodies: See Blood, ketone bodies
azotemia and lipoid nephrosis, 159
azotemia; hyperazotemia and relation to NaCl deficiency, 1349
bactericidal action of human serum on hemolytic streptococci, 1080
bactericidal properties; origin of naturally occurring immune bodies for pneumococci in infants, 1081
bilirubin; reducible by-product of Stokvis in blood of normal men, 1082
bisulfite binding substances in blood in health and disease, 1090
calcium and phosphorus content of cord blood in new-born, 1359
calcium changes during sleep and during rest without sleep, 590
calcium content of serum during epileptic convulsion, 411
calcium in normal and spasmophilic children, 595

Blood—Continued
calcium; induced hypercalcemia; possible therapeutic relation to thrombocytopenic purpura, 99
calcium, influence of insulin on calcium curves of child, 103
calcium; influence of irradiated ergosterol and parathyroid extract on rate of disappearance of intravenously injected calcium chloride, 99
calcium; ionized blood calcium in patients with renal calculi, 647
calcium; method for determination, 1082
calcium; rôle of calcium in spontaneous overbreathing tetany, 637
carotenemia and diabetes mellitus; necropsy report and analyses of liver for carotene, vitamin A, total fat and cholesterol, 360
cevitamic acid content of blood serum of women in labor and of children at birth; relation to latent scurvy, 1353
changes; effect of anterior pituitary-like hormone on blood picture in rabbits, 1158
chlorides; value of corpuscle chloride-plasma chloride ratio in management of severe diarrheas (toxicoses), 1393
cholesterol, hypercholesteremia and hypochromic anemia in child with myxedema, 428
cholesterol metabolism; hypocholesteremia, 1348
circulation; disturbances of circulatory system due to pneumonia and other toxic conditions, 619
circulation; endarteritis obliterans in infant girl, 442
circulatory failure, treatment of, 136
coagulation, absence of effect of swallowed saliva on, 1133
coagulation; anticomplementary and anticoagulant action of barbiturates, 1080
coagulation in anaphylactic and other types of shock, 444
coagulation; investigations on hemophilia, *713
copper; variations of copper in blood of infants at different ages, 1348
count; accuracy of methods, 392
destruction high in new-born, 114
Diseases: See Anemia; Hematopoietic System; Leukemia; etc.
dyscrasia; diagnosis in children, 133
dyscrasia; sternal marrow puncture, *209
familial hemolytic disease, 137
fetal; study on gases in umbilical blood, 890
grouping in scarlet fever, 375
groups; comparison of O substance in newborn and in adults, 113
Injections: See Blood, transfusion; Serotherapy and Hemotherapy
iodine in rachitic children, 597
irradiated with ultraviolet rays; use in allergic conditions, 1093
ketone bodies; acetonemia in infancy, 853
ketone bodies; curve for child; character and significance in determining hepatic function, 102
ketone bodies; insulin treatment of periodic vomiting with acetonemia, 1144
ketone bodies; significance of so-called acetonemic crisis in hypoglycemic coma, 1084
lactic acid content of, in feeding problems, 1085
lipid partition of erythrocyte stroma, 1192
lipids and thyroid disease, 426
morphologic blood pictures of premature and full term infants during first months of life, 621
oxalic acid content of, effect of antiscorbutic vitamin on, 1092
oxygen; anoxemia in premature infants, 860
phosphatase; significance of plasma phosphatase in diagnosis and prognosis of rickets, 1091
phosphates; relation of serum phosphates to parathyroid tetany, 651
phosphorus, effect of ultraviolet rays on, 1085
Platelets: See also Blood, count
Blood—Continued
platelets; hormonal regulation of number of platelets, 618
platelets; thrombocyte values in childhood, 889
porphyrin in normal blood cells, 1135
pressure correlated with hormonal secretion in children, 889
pressure; effect of increased intracranial venous pressure on pressure of spinal fluid, 905
pressure, low; intravenous injection of hypertonic solution of sodium chloride in treatment of some conditions of low blood pressure, 887
production, effect of brewer's yeast on, 596
proteins; alteration as index of hepatic failure, 630
proteins; changes during sleep and during rest without sleep, 590
proteins; dietary protein and regeneration of serum albumin, 685
proteins; investigation on hemophilia, *713
sedimentation; electrophoretic mobilities and sedimentation velocities of red cells from normal and pregnant human beings, 132
sedimentation in scarlet fever and its complications, 1106
sedimentation rate, influence of external temperature on, 1133
sedimentation rate; method for determining rate with use of capillary blood, 886
sedimentation rate, practical importance of, 1134
sedimentation reaction in pediatrics, heparin in, 1382
Serum: See Serum; and under other subheads under Blood
Sugar: See also Carbohydrates; Dextrose; Diabetes Mellitus; Insulin; etc.
sugar; advantage of high protein diet in treatment of spontaneous hypoglycemia, 852
sugar; cerebral regulation of sugar level in childhood, 890
sugar content during fasting, 1188
sugar content in convulsions, 413
sugar curve in diphtheric infections, 119
sugar; early alimentary hypoglycemia or prehyperglycemia in children, 900
sugar, effect of ultraviolet rays on, 1085
sugar, effect of vitamins A and C on, 598
sugar in diabetes in children, *1005
sugar, influence of insulin on sugar curves of child, 103
sugar level, effect of encephalography on sugar level of children, 1395
sugar; significance of so-called acetonemic crisis in hypoglycemic coma, 1084
sugar; spontaneous hypoglycemia with peculiar psychic disturbances, 1349
sugar studies in hay fever and asthma, 895
transfusion in childhood, 671
transfusion, results in primary pneumonia, *23
transfusion, suggestions to facilitate venipuncture in, 1417
urea, simple method for determination of, 1346
Vessels: See also Arteries; Capillaries; Endarteritis; Veins; etc.
vessels; changes in sickle cell anemia, *1045
vitamin C content of, 682
vitamin D content of, 1184
water content of blood of 1,239 boys and girls in secondary schools, 854
Bloomberg, E.: Rickets resistant to vitamin D therapy, *529
Body; biometric data and morphologic median of Cantanese new-born, 864
development; clinical method of studying nutrition of school children, 593
development, relation to constitutional form, talent and character at school age, 182
physical and mental retardation; probable rôle of attempts at abortion, 182
relation of physical defects to growth of children of 21 states, 106
Bones: See also under names of bones
atrophy; chondro-osteodystrophy, Brailsford-Morquio type, 655

Bones—Continued
atrophy; gargoylism; chondro-osteodystrophy, corneal opacities, hepatosplenomegaly and mental deficiency, 601
atrophy; gargoylism of type E; multiple anomalies of skeleton, enlargement of liver and spleen and mental retardation, 364
atrophy; Morquio's disease; report of 2 cases, 166
calcium and phosphorus content of viosterol shadows in bones, 930
changes in erythroblastic anemia and chronic or congenital malaria, similarity of; successful treatment of 8 patients with quinine, *60
changes in sickle cell anemia, *1045
cyst, simulated by bone abscess, 1162
cysts, solitary; etiology and pathogenesis, 167
Deformities: See Abnormalities and Deformities; Osteitis deformans; Poliomyelitis; Rickets; etc.
Diseases: See also Osteitis; Osteochondritis; Osteomyelitis; etc.
diseases; hemo-osteopathy of Cooley, 888
Dystrophy: See Bones, atrophy; Osteitis
Fractures: See Fractures
Fragility: See also Osteosclerosis fragilis
fragility; clinical aspects of osteopsathyrosis, 928
fragility; erythroblastosis with osteoporosis; Cooley's syndrome, 619
fragility; osteoporosis and metabolism of calcium and phosphorus in 3 cases of acromegaly, 427
fragility; pathologic-anatomic investigation regarding nature of osteogenesis imperfecta, 929
fragility; periosteal dysplasia; report of case, 167, 1162
growth and roentgenographic estimation of age for medicolegal purposes, 943
growth and subclinical hypothyroidism in children, 650
growth; cleidocranial dysostosis, 1356
growth; Crouzon's disease; hereditary craniofacial dysostosis, 1097
growth; dysostosis cleidocranialis hereditaria, 862
growth; faciocranial dysostosis (Crouzon's disease) in healthy family, 107
growth, in relation to failure of abundant sunshine to protect against rickets, 1227
growth; ossification of bone centers of hand correlated with general growth stages, 654
growth; ossification of carpal centers in Negro children in Cape Town, South Africa, 590
growth; ossification of carpus in rickets, congenital syphilis and cretinism, 432
growth; problem of calcification, 100
marrow, embryonic reticulosarcoma of; Ewing's sarcoma of grave type, 166
marrow; relation to anterior pituitary insufficiency and function of stomach, 1161
marrow; sternal marrow puncture, *209
mineral composition of bone of human fetus, *1025
regeneration and thymus gland, 429
regeneration; relation to thyroid gland, 925
roentgenography; localized transverse shadows in metaphyses of long bones, 1163
skeletal changes in rat induced by ration poor in inorganic salts, 98
syphilis, congenital, 385
syphilis of; lag phase in early congenital osseous syphilis; roentgenographic study, 124
tuberculosis and epituberculosis, 1374
tuberculosis; atypical localization of osteitis tuberculosa multiplex cystica, 1129
tuberculosis; case of osteitis tuberculosa with distinct enlargement of bone nuclei and atypical localization, 1377
tuberculosis of shafts of long bones, 125
tuberculosis, roentgen features of; cystic tuberculosis of ilium, 1128
tuberculosis, treatment of; urinary tract complications in prolonged immobilization of children, 158
von Bonin, G.: Macroglossia in children; review of literature; report of case of true muscular hypertrophy; classification, *1328

Book Reviews:
Aids to Diagnosis and Treatment of Diseases of Children; F. M. B. Allen, 691
Anleitung zur Konstitutionsdiagnostik bei kindlicher Tuberkulose (an Hand von praktischen Beispielen); K. Klare, 964
Avitaminoses; W. H. Eddy and G. Dalldorf, 1199
Backward Child; C. Burt, 1429
Bacteriology of Specific Communicable Diseases; M. S. Marshall, 1200
Care and Diet of Children; H. S. Reynolds, 1200
Children Handicapped by Cerebral Palsy; E. E. Lord, 451
Children in Family; H. D. Anderson, 690
Clinical Allergy Due to Foods, Inhalants, Contactants, Fungi, Bacteria and Other Causes; Manifestations, Diagnosis and Treatment; A. H. Rowe, 963
Clinical Psychology; C. M. Louttit, 198
Development of Human Skeleton [Chart]; P. C. Hodges, 1431
Dietetics for Clinician; M. A. Bridges, 690
Diphtérie; B. Carrière, 198
Diphtherie; F. Hamburger, 1201
Diseases of Infants and Children; J. P. C. Griffith and A. G. Mitchell, 689
Diseases of Nervous System in Infancy, Childhood and Adolescence; F. R. Ford, 1430
Diseases of Newborn; A. Tow, 689
Elements of Orthopaedic Surgery; N. R. Smith, 1200
Erbgesundheitsgesetz und Ermittlung kindlicher Schwachsinnszustände mit den Entwicklungstests von "Bühler-Hetzer"; E. Vowinckel, 964
Erbrechen im Kindesalter; J. Siegl, 1200
Essentials of Electrocardiography for Student and Practitioner of Medicine; R. Ashman and E. Hull, 962
Feeding Behavior of Infants; A. Gesel and F. L. Ilg, 1430
Feeding, Diet and General Care of Children; A. J. Bell, 199
Handbook of Orthopedic Surgery; A. R. Shands Jr., 1198
Handbook on Diseases of Children, Including Dietetics, Welfare and Common Fevers; B. Williamson, 1200
Hearing and Speech in Deaf Children; P. M. T. Kerridge, 962
Hemophilia; C. L. Birch, 965
Jugendliche Schwachsinn; W. Weygandt, 199
Juvenile Paresis; W. C. Menninger, 690
Little Things in Life; B. Sure, 961
Management of Obstetric Difficulties; P. Titus, 450
Mental Deficiency; A. F. Tredgold, 1431
Neurología infantil; A. Gareiso and F. Escardo, 201
Patient and Weather; W. F. Petersen, assisted by M. E. Milliken, 1429
Pediatric Dietetics; N. T. Saxl, 1201
Physiologie und Pathologie des Wasserhaushaltes; L. v. Kostyál, 197
Prophylaxis and Treatment of Rheumatic Disease Through Photofixation of Pathogenic Antigens: Photo-Immunization and Photovaccination; Theoretical Possibility of Immunizing Olfactory Mucosa Against Poliomyelitis Virus; S. Peskind, 690
Psychology of Exceptional Children; N. V. Scheidemann, 1201
Quarterly Bulletin of Health Organisation of League of Nations, 965
Rapport sur le service des enfants assistés du Département de la Seine, 1935; L. Mourier, 965
Reading, Writing and Speech Problems in Children; S. T. Orton, 689
Recent Advances in Allergy (Asthma, Hay-Fever, Eczema, Migraine, etc.); G. W. Bray, 1198
Recent Advances in Orthopaedic Surgery; B. H. Burns and V. H. Ellis, 201
Registro e interpretación de la actividad cardiovascular del lactante normal; A. S. Segura, 965

Book Reviews—Continued
Slovensko bez dorastu? A. J. Chura, 200
Synopsis of Pediatrics, J. Zahorsky and T. S. Zahorsky, 200
Thyroid and Its Diseases; J. H. Means, 1199
Ueber die Ernährung des Säuglings; H. Beumer, 1431
Vermeidbare Kinderkrankheiten; W. Birk, 199
Zahnärztliche Fragen der Kinderheilkunde in der Praxis; B. Orban and A. M. Schwarz, 451

Botryomycosis, Hominis: See Granuloma pyogenicum
Bourneville's Disease: See Sclerosis, tuberous
Bowman, J. E.: Case of primary aplastic anemia in infant, 1423
Chronic stridor in infancy, 1426
Boyd, G. L.: Treatment of bronchiectasis in children, 955
Boyd, J. D.: Blood sugar in diabetes in children, *1005
Brachydactylia: See Fingers and Toes, abnormalities
Brain: See also Meninges; Nervous System; etc.
abnormality; cerebrocerebellar hemiagenesis, 1395
abscess, complicated by ventricular communication and internal hydrocephalus, 637
abscess, ophthalmic symptoms in, 149
arhinencephaly with extreme eversion of endbrain, 633
blood supply; anomalies of circle of Willis with resulting encephalomalacia and cerebral hemorrhage, 148
carbuncle of; unusual case, with recovery, 960
cerebral frontal agenesis in association with epilepsy, 411
congenital atresia and stenosis of aqueduct of Sylvius; anatomic study of 6 cases, 633
cortical encephalomalacia in infancy; infantile cerebral paralysis, 633
disorders; encephalography and infantile encephalopathies, 153
Encephalography: See Brain, roentgenography
hemorrhage; cerebral hemorrhage complicating Werlhof's disease, 889
hemorrhage; intraventricular hemorrhage in child, 151
lemmoblastosis, diffuse, of central nervous system, 910
lesions in uncomplicated fatal diabetic acidosis, 419
malformation; congenital malformation of cerebrum associated with microcephaly, 634
nuclear aplasia of Moebius combined with arhinencephaly, 640
roentgenography; effect of encephalography on blood sugar level of children, 1395
roentgenography; encephalography and infantile encephalopathies, 153
roentgenography; examination of ventricular cavities with iodized oil, 908
roentgenography; review of 800 encephalograms, with special reference to subdural air, 149
roentgenography; ventriculography by opaque injection, 151
telangiectases, multiple, of brain; hereditary factors in their development, 410
trauma followed by aphasia in girl 4 years old, 156
trauma in children, 155
trauma; subarachnoid hemorrhage (of traumatic origin?), 413
tumor at base of brain in children, 1149
tumor; cerebral angiomas; importance of cerebral angiography in diagnosis, 637
tumor; clinical and pathologic review of several cases, 1150
tumor; epilepsy combined with calcified intracranial hemangioma; case report, 155
tumor; glioma of aqueduct of Sylvius, 903
tumor in children, 150, 639
tumor in first 10 years of life, 414
tumor; initial symptoms and early diagnosis of, 635
Brain—Continued
tumor; nervous crises and loss of caloric response (vestibular) as signs of tumor of fourth ventricle, 908
tumor; rhinorrhea and neoplasms of central nervous system, 635
urea deposition in brain in diphtheria, 607
vascular disease due to sickle cell anemia, 614
water and electrolyte distribution in brain, effect of hyperthermia on, 183
Breast Feeding: See Infant Feeding; Milk, human
hypertrophy, simple, in girl 8 years old, 181
mammary gland in normal adolescent male, 355
Milk: See Infant Feeding; Lactation; Milk, human
Bridge, E. M.: Significance of respiratory quotient during fasting, 1188
Brodie, J. L.: Failure of abundant sunshine to protect against rickets, *1227
Brodie's Abscess: See Radius, abscess
*tri*Bromethanol: See under Anesthesia
Bronchi; bronchotetany, clinical case of, 628
carcinoma of bronchus in boy aged 19, 1140
Diseases: See Bronchiectasis; Bronchitis; Bronchopneumonia
Foreign Bodies: See under Foreign Bodies
injury; artificial pneumothorax through piercing wound of bronchus caused by tack, 400
recent bronchographic results in dilatation of bronchi, 897
roentgenography; diagnosis of encroaching processes, 1141
secondary thrush of, 896
Bronchial Glands: See Lymph Nodes
Bronchiectasis; bronchographic results in dilatation of bronchi, 897
case of, 1388
etiology of; significance of congenital anlage and acquired pneumonia for development of bronchiectasis in childhood, 629
in children, 1141
lobectomy in, 627
relation of staphylococci to, 1135
surgical treatment in children; report of 3 cases, 896
treatment in children, 955
Bronchitis, chronic, in children, 1141
relation of staphylococci to, 1135
roentgen therapy in children, 896
Bronchopneumonia and tuberculous infiltration of lung, 1128
cryptococcic, *81
interstitial, in children, 1387
Bronchoscopy: See also under Bronchiectasis; etc.
recent advances in bronchoscopy of children, 139
Bronstein, I. P.: Macroglossia in children; review of literature; report of case of true muscular hypertrophy; classification, *1328
Brooks, C. S.: See Singer-Brooks, C.
Brown, A.: Dermatorrhexis; report of case, 956
Prolactin; effect on secretion of breast milk, 950
Brucella Abortus; Brucella Melitensis: See Bacteria, abortus and melitense group
Brucellosis: See Undulant Fever
Bruch, H.: Osteodystrophia fibrosa, combined with precocious puberty, pathologic pigmentation of skin and hyperthyroidism; report of case; review of literature, *806
Buchanan, D. N.: Sympathetic innervation of external sphincter of human bladder, *1012
Bucy, P. C.: Sympathetic innervation of external sphincter of human bladder, *1012
Burns: See also under Eyes
acute toxemia of; extract of adrenal cortex in treatment, 176
contractures resulting from burns, repair of, 1171
mortality from accidental burns among children in different geographic regions of United States; changes from 1925 to 1932, 439
severe, significance of loss of serum protein in therapy of, 176

Burns—Continued
tissue response to subcutaneous injection of cod liver oil for burns, 360
toxin formation in burned tissues, 1171
treatment; correlation with recent experimental studies, 666
treatment with silver nitrate ointment, 667
Butler, A. M.: Rickets resistant to vitamin D therapy, *529

Calcaneum; abscess of apophysis of os calcis in child, 1411
Calcification: See also under Bones, growth; Brain; Parathyroid; Teeth
calcinosis interstitialis universalis, 661
generalized interstitial calcinosis in child 5½ years of age, 936
problem, 100
Calcinosis: See Calcification
Calcium, Deposits: See Calcification
in Blood: See Blood, calcium
metabolism, 99
metabolism and kidneys, 591
metabolism; calcium and vitamin D in metabolic processes, 1088
metabolism in relation to disease, 99
metabolism in 3 cases of acromegaly (1 case of osteoporosis), 427
variability of metabolic response of different children to, 592
Calculi: See Kidneys; Urinary Tract
Campbell, G. A.: Trichophytobezoar; report of case, 946
Camphor, Therapy: See under names of various diseases, as Diphtheria
Cancer: See also Sarcoma; Tumors; and under names of organs and regions
brain tumor in child, 639
carcinoma of bronchus in boy aged 19, 1140
carcinoma of choroid plexus with unusual clinical manifestations, 1151
carcinoma of ovary in girl 12 years of age, 917
carcinoma of tongue in new-born, 603
in childhood, 182
primary, of lung in 11 year old child, 628
primary, of lung in girl 5 years old, 143
primary, of lung in 2 children, 143
sacrococcygeal tumor, 1164
syndrome of diffuse intraprotuberential gliepithelioma, 1398
teratoma of ovary; influence of endocrine glands on ovarian tumors in childhood, 917
Cancrum Oris: See Stomatitis, gangrenous
Capillaries; capillary resistance of new-born and of infant in first year of life; latent scurvy in infants, 1352
Capsicum; ascorbic acid content of Manchurian paprika, 359
Carbohydrates: See also Dextrose; Glycogen; Lactose; etc.
carbohydrate dyspepsia, blood sugar in, 1093
Metabolism: See also Blood, sugar; Dextrose; Glycogen; etc.
metabolism and emotional and instinctual factors in diabetes mellitus, 1157
metabolism and glycogen, 357
metabolism; glycemic response to isoglycogenic quantities of protein and carbohydrate, 921
metabolism, intra-uterine, 595
metabolism; maintenance of carbohydrate levels in fasted hypophysectomized rats treated with anterior pituitary extracts, 426
metabolism; self-selection of diets by rats, 1180
metabolism, vital and postmortem, in glycogenosis and disturbances of thyroid function, 1394
Carbon tetrachloride, liver preparation protecting against necrosis from, 670
Carbuncle of brain, unusual case of; recovery, 960
Carcinoma: See Cancer; and under names of organs and regions
Cardiovascular Diseases: See Heart
Caries, Dental: See Teeth
Carotene, histologic studies of effects produced by large doses of, 857
hypodermic injections of, in treatment of phlyctenular conditions and vitamin A deficiency diseases in ophthalmology, 437
in Blood: See under Blood
Carpus: See Wrist
Carrots, histologic studies of effects produced by large doses of, 857
Cartilage; mineral composition of cartilage of human fetus, *1025
Catalepsy in tuberculous children, new observations on symptoms of, 1126
Cataract, congenital, occupational ability of persons operated on for, 171
embryonal, fetal, zonular and central, 1166
juvenile, associated with atopic dermatitis (disseminated neurodermatitis) in 10 young adults, 661
zonular; relation to rickets and tetany, 934
Catatonia: See under Dementia Praecox
Celiac Disease, 1146
Gee-Herter's disease; new case in Rikshospital, 148
Gee-Thaysen disease; idiopathic steatorrhea of adults and adolescents in nontropical countries, 404
intestinal infantilism, 1145
intestinal infantilism and pseudopernicious anemia, 410
treatment of, 1145
Cephalematoma: See Cranium, hematoma
Cereals, rachitogenic factors in, 106
Cerebrospinal Fever: See Meningitis
Cerebrospinal Fluid, 154
action of spinal fluid of horse in some dystrophic states in infancy, 600
albumin fractions in childhood, 640
calcium in; rôle of calcium in spontaneous overbreathing tetany, 637
changes in biologic properties in epilepsy, 1400
drainage in treatment of acute head injuries, 1415
iodine content of, in children from birth to age of 9 years, 414
physiopathologic changes in intracranial pressure associated with production and resorption of spinal fluid, 906
pressure, effect of increased intracranial venous pressure on, 905
protein fractions in childhood, 639
reducing substance in ventricular and spinal fluid of hydrocephalic children, 415
Cerebrum: See Brain
Cervix: See under Uterus
Cesarean section with intracranial hemorrhage, 1101
Cevitamic Acid: See Scurvy; Vitamins, C
Chair, transformable, for use in treatment of congenital dislocation of hip, 1162
Character, relation to bodily development, constitutional form and talent at school age, 182
Chest: See Thorax
Chickenpox; acute thrombocytopenic purpura after varicella, 1102
concurrent diphtheria and varicella with hemorrhagic features; report of case, 870
herpes zoster and varicella, 871
problem of chickenpox and herpes zoster, 1169
Child Welfare: See also Infant Welfare
child hygiene in Hungary, 362
familial and institutional placement for children, 1094
free school meals, rationale of, 357
intracutaneous tuberculin test and use of fluoroscope in county survey, 126
mental hygiene and day nursery, 644
physical welfare of youth, 858
protection of children by department of the Seine; rôle of visiting nurse, 602
supervision of school hygiene and sanitation, 859

Children: See also Infants; New-Born Infants; Pediatrics; etc.
Growth: See Growth
Nervous and Mental Disabilities: See Feeblemindedness; Idiocy; Nervous and Mental Disabilities; and under names of various diseases
Chinese, catamenia of 2,000 Chinese school girls, 920
congenital bone syphilis in, 385
stovarsol treatment of congenital syphilis in Chinese children, 386
tuberculous meningitis in, 386
Chlorates; toxic potentialities of continued administration of chlorate for blood and tissues, 1081
Chlorides in Blood: See Blood, chlorides
metabolism, problem of, 103
Chloroform, Anesthesia: See under Anesthesia
Chloroma, myeloid; systemic disease of myeloid tissue in children, 1411
report of case, 1130
Cholecystogastrostomy: See Gallbladder, surgery
Cholesteremia: See Blood, cholesterol
Cholesterol in Blood: See Blood, cholesterol
metabolism; hypocholesteremia, 1348
Chondrodysplasia, 1095, 1096
Ollier's disease, 930
Chondrodystrophia Fetalis: See Achondroplasia
Chondrodystrophy: See Achondroplasia
Chorea and heart disease in children; age at onset and at recurrences in 488 cases of juvenile rheumatism ushered in by major clinical manifestations, 1129
constitutional aspects of; sequelae, 636
fibrillary, of Morvan, infantile acrodynia and psychic disturbances, 151
gravis, treated with avertin; report of case, 636
hemichorea associated with lesion of corpus Luysii, 150
hereditary; psychologic state of choreic patients, 909
independence of chorea and rheumatic activity, 1115
minor, treatment by means of electropyrexia, 412
Sydenham's, cured by injections of sodium salicylate, 906
Sydenham's, treatment with typhoid-paratyphoid vaccine, 1148
treatment with artificial fever, 412
treatment with hyperpyrexia induced by hydrotherapy, 1147
Choroid inflammation; familial hyaline dystrophy in fundus oculi, or Doyne's family honeycomb "choroiditis," 1164
plexus, carcinoma of; unusual clinical manifestations, 1151
Christian-Schüller Syndrome: See Schüller-Christian Syndrome
Church, C. F.: Effect of diet on resistance to infection; maternal diet, 1178
Chvostek sign without spasmophilia during first 2 years of life, 1151
Cicuta maculata; report of poisoning by American water hemlock, 670
Circulation: See Blood, circulation
Circumcision, indications for, 667
Citrate, effect on experimental rickets, *548
Clarke, H. T.: Origin of vitamin D and relation to solar radiation, 1183
Clavicle, Cleidocranial Dysostosis: See Bones, growth
Cleft Palate: See Palate
Cleland, W.: Case of probable congenital tuberculosis, 1427
Climate: See also Altitude; Health Resorts; Weather
influence of change of climate on vitamin C content of mother's milk, 1092
Cloaca, rectovaginal, and imperforate anus, 600
Clubfoot: See under Foot, deformities
Clubhand: See under Hand, deformities
Coccyx: See Sacrococcygeal Region
Cod Liver Oil, antirachitic effectiveness of, 1087
antirachitic efficiency of vitamin D in, 360
irradiated; bactericidal and photochemical properties, 591
tissue response to subcutaneous injection of, 360
Colby, M. G.: Relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
Cold, hypersensitiveness to, causing collapse while swimming, 1413
Colds: See Respiratory Tract, diseases
Collagen; vitamin C and formation of intercellular material, 1089
Colloids; applied colloid science in infant nutrition, 854
Coloboma: See under Eyelids
Colon: See also Gastro-Intestinal Tract; Intestines; Sigmoid
congenital stenosis of entire colon, *1320
dilatation; megacolon and chronic appendicitis in children, 1146
dilatation; microcolon and Hirschsprung's disease, 631
Color perception, development of, in childhood, 934
Colostrum, human, demonstration of follicle-stimulating hormone in, 853
Colwell, C. A.: Infection of lower part of genital tract in girls, *459
Coma: See under Blood, sugar
Communicable Diseases: See also Immunity; Measles; Meningitis; Syphilis; etc.
acute empyema as complication in contagious diseases, 397
age incidence and sex incidence of milk-borne epidemics, 123
appendicular symptoms in acute infectious diseases, 118
cross-infection; prevention in children's hospitals, 670
current prevalence in United States, 106, 370, 870, 1105, 1361
Concussion, Cerebral: See under Brain
Conjunctiva; conjunctivopalpebral tumor (dermolipoma) of exceptional development in new-born, 1358
cysts; retention cyst of unusual size, probably of Krause's gland, simulating angioma of orbit, 657
syphilitic lesions of cornea and conjunctiva in new-born, 863
Conjunctivitis, Diphtheric: See Diphtheria, conjunctival
inclusion virus of, 168
swimming pool conjunctivitis and keratitis punctata superficialis; some cases in Chinese, 658
trachomatous, in children; treatment, 658
Consanguinity: See under Marriage
Constipation due to malformation of sacral portion of spinal cord, *1017
Constitution, heredity and injury to germ plasm, 108
Contagious Diseases: See Communicable Diseases
Contracture; familial flexion contraction of fingers, 110
Convulsions: See also Epilepsy; Tetany; etc.
blood sugar content in, 413
in children; predisposing causes, 1400
repeated minor convulsions of childhood (pyknolepsy), 154
Cooley, T. B.: Relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
Stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants: basic study, *726
Cooley Syndrome: See Pseudoleukemia, infantile
Cooper, M. B.: Erythrophagocytosis in anemia of new-born; report of 2 cases, 1191
Cooper, M. L.: Bacteriologic studies of epidemic of pleurodynia, *231
Cooperstock, M.: Laurence-Moon-Biedl syndrome, *334
Copper in Blood: See under Blood

Cordua, O. B.: Failure of abundant sunshine to protect against rickets, *1227
Cornea, opacities in gargoylism, 601
Pannus: See Trachoma
pigmented deposits of doubtful nature, 169
softening; keratomalacia, 934
syphilitic lesions of cornea and conjunctiva in new-born, 863
Correction to article by J. Warkany, entitled, "Estimation of Vitamin D in Blood Serum" (52: 831, 1936), 943
Corynebacteria: See Bacteria, corynebacteria
Cough, chronic, during childhood; roentgen treatment, 622
irritating, due to inflammation of pharyngeal lymphoid follicles; pharyngitis granulosa irritans, 139
symptom of cough in relation to chronic and acute illness in childhood, 399
Cowen, D.: Granulomatous encephalomyelitis due to encephalitozoon; new protozoan disease of man, 1196
Cowie, D. M.: "Auto passive transfer," 448
Cowpox outbreak caused by vaccination involving 2 families and 2 herds of cattle, 370
Cram, E. B.: Studies on oxyuriasis; problem of therapy, *1276
Cranium: See also Frontal Bone; Occipital Bone; Temporal Bone; etc.
Abnormalities: See also Acrocephaly; Microcephaly; etc.
abnormalities; dyscephalodactylism (Vogt) and developmental anomalies of uveal tract, 108
abnormalities; hypertelorism of Greig; paretic and hereditary type, 602
anthropologic study of skull of new-born, 1359
changes in vessels and bones in sickle cell anemia, *1045
depression in new-born, 112
fractures; skull fractures in infants, 938
hematoma; ossification of cephalohematoma, 927
injuries, acute, drainage of cerebrospinal fluid in treatment of, 1415
oxycephalus; premature synostosis of cranial sutures, 1355
Creatine metabolism in pubertas praecox, 919
Creatinuria: See under Urine
Cretinism: See also Myxedema
effect of thyroid on nitrogen balance in period of growth, 1191
growth, osseous development and mental development in cretins, 193
ossification of carpus in, 432
sporadic, roentgenographic support of clinical diagnosis of, 429
van Creveld, S.: Investigations on hemophilia, *713
Crime and criminals; do problem children become criminals? 1401
Cross, E. H.: Congenital stenosis of entire colon, *1320
Crouzon's Disease: See Bones, growth
Cryptococcic bronchopneumonia, *81
Cryptorchidism: See Testicles, undescended
Cullen, G. E.: Acidosis and alkalosis in children, 183
Culture Media: See Viruses, culture; etc.
Cuneiform Bone: See Tarsus
Cushing Syndrome: See Pituitary Body, tumor
Cyanosis; diagnosis and treatment of cyanosis of new-born, 366
nonobstructive, periodic, of new-born; clinical study of cyanotic spell, 1357
of new-born due to massive congenital diaphragmatic hernia, 1419
paroxysms of apnea with cyanosis in newborn with intracranial hemorrhage, 1358
Cystitis: See Bladder, inflammation
Cystoscopy: See under Bladder
Cysts: See also under names of organs and regions, as Bones; Jaws; Mesentery; Omentum; etc.
Branchial: See under Fistula
Echinococcus: See Echinococcosis
Daniels, E. A.: Rectal disorders in childhood, *573
Danlos-Ehlers Syndrome: See Joints, abnormalities; Skin, abnormalities
Darby, H. H.: Origin of vitamin D and relation to solar radiation, 1183
Dark Adaptation: See under Eyes
Davidson, L. T.: Congenital thrombopenia, *1324
Deaf-Mutism; sound feeling in deaf-mutes, practical significance of, 893
with hydrocephalus, 639
Deafness: See also Hearing; Otitis Media
and clinical aspects of osteopsathyrosis, 928
hard of hearing child, 394
hereditary; diagnosis in patient with lateral distribution of residual hearing and of vestibular excitability, 1386
hereditary, law of symmetry in, 140
of central origin following pertussis, 119
problem of severely deaf child, 948
total and permanent deafness from parotitis, 892
Defectives: See Feeblemindedness; Nervous and Mental Disabilities
Deficiency Diseases: See also Beriberi; Diet and Dietetics; Nutrition; Scurvy; Vitamins; etc.; and under names of various diseases
avitaminosis in relation to oral pathology, 1090
kwashiorkor, 104
nutritional deficiencies and development of heart failure in organic heart disease, 133
prevention and treatment, 1351
progress in early recognition of vitamin deficiency states, 1089
reversion of cardiac enlargement in 4 year old child after treatment for avitaminosis, 1132
self-selection of diets by rats with, 1180
wasting in infancy, 357
Deformities: See Abnormalities and Deformities; and under names of organs and regions
Degeneration, hyaline; familial hyaline dystrophy in fundus oculi, or Doyne's family honeycomb "choroiditis," 1164
of Amsterdam type; report of case, 602
Dehydration; histopathologic changes in central nervous system in experimental exsiccosis and toxicosis, 415
therapeutic use of hypertonic saline solution in infants, 146
therapeutic value of various artificial solutions in infants suffering from, 181
therapy; factors influencing disposition of fluids given intravenously, 185
Delinquency; do problem children become delinquents and criminals? 1401
family and social environment of delinquent child, 1153
juvenile, medicine and law, 1401
mental retardation and juvenile delinquency, 913
social adaptation of persons with abnormalities of intelligence and character, 1153
study of 400 juvenile delinquents, 914
treatment with acetylcholine for certain character changes in children with tendency to impulsive behavior, 915
Dementia: See also Insanity; etc.
paralytica; psychology of juvenile paretic neurosyphilis, 882
praecox; catatonia due to pyelitis, 419
praecox; functional psychoses in children, 912
praecox; schizophrenia in boy 4 years old, 916
Denney, W. L.: Rôle of heredity in practice of pediatrics, 944
Dentifrices; toxic potentialities of continued administration of chlorate for blood and tissues, 1081
Dentin: See Teeth
Dentition: See under Teeth
Depression, Economic: See Economic Conditions

Dermatitis: See also Eczema; Neurodermatitis; etc.
acute, in new-born, 864
Atopic: See Neurodermatitis
bullosa caused by petroleum, 1170
exfoliativa neonatorum (Ritter): 7 cases, 368
exfoliativa (Ritter), case of, 175
Rhus: See Rhus
Dermatochalasis: See under Skin
Dermatophytosis: See under Ringworm
Dermatorrhexis: See under Skin
Dermoid: mediastinal teratoma in child 7 months old, *1057
Dermolipoma; conjunctivopalpebral tumor of exceptional development in new-born, 1358
Devil's Grip: See Myositis, epidemic
Dewar, M. M.: Effect of citrate and tartrate on experimental rickets, *548
Dextrocardia: See Heart, displacement
Dextrose: See also Blood, sugar; Carbohydrates
effect on gastric secretion, 355
Tolerance: See also Blood, sugar
tolerance curves in families of diabetic children, 430
tolerance, impairment in certain alimentary disorders of childhood; treatment with liver extract, 405
value of rectal administration of, 102
Diabetes Insipidus: See also Schüller-Christian Syndrome
case of, 1408
effect of interruption of supra-opticohypophyseal tracts on antidiuretic, pressor and oxytocic activity of posterior lobe of hypophysis, 649
polyuria, polydipsia and glycosuria resulting from animal experiments on hypophysis and environs, 420
treatment with extract of hypophysis, 428
Diabetes Mellitus: See also Blood, sugar
abscess tonsillectomy in, 925
arteriosclerosis in young diabetic patients: recognition by measurements of arterial elasticity, 419
blood lipids of diabetic children, 921
blood pressure and hormonal secretion in diabetic children, 889
carotenemia and diabetes; necropsy report and analysis of liver for carotene, vitamin A, total fat and cholesterol, 360
cerebral lesions in uncomplicated fatal diabetic acidosis, 419
coma; treatment in childhood, 1409
delivery and care of new-born of diabetic mother, 365
diabetogenic action of anterior pituitary independent of adrenals, 925
diet in; liberal carbohydrate diets for diabetic children, 1407
emotional and instinctual factors in, 1157
glycemic response to isoglycogenic quantities of protein and carbohydrate, 921
hepatomegaly with retardation of statural growth in diabetic child, 1143
hyperinsulinism of new-born in case of, 431
hypoglycemia of new-born and course of diabetes in mother, 1101
in childhood, 652, 1408
in infancy, 426
pain in; acute abdominal pain in juvenile diabetes, 162
sugar content of blood of diabetic children, *1005
sugar tolerance curves in families of diabetic children, 430
treatment; effect of intravenous administration of protamine insulin, 941
treatment in children, 1409
treatment in various countries; result of inquiry concerning problems, 1160
treatment; influence of zinc acetate on effect of insulin, 431
treatment of severe diabetes with protamine insulinate, 164
treatment with protamine insulin in childhood, 925, 926, 1409
treatment with protamine insulin in infancy, 1407
tuberculosis and juvenile diabetes, 162
Diaphragm, eventration of, 632
eventration; clinical aspects, 631
Hernia: See Hernia, diaphragmatic
Diarrhea: See also Dysentery
acute; rôle of fungi and anaerobes in diarrhea of infants, 1392
B. coli-mutabile from outbreak of diarrhea in new-born, 862
effect of acetic acid on intestinal motility, 1394
in childhood, *573
infectious, in new-born caused by unclassified species of Salmonella, *1252
occurrence of numerous cases of diarrhea of uncertain etiology in infants, 407
severe; value of corpuscle chloride-plasma chloride ratio in management of toxicoses, 1393
treatment of acute diarrheal disorders with banana and banana powder, 1143
treatment of infantile diarrhea with substances extracted from honey, 1145
treatment with apple diet and pectin-agar mixtures, 1142
treatment with apple diet in infants, 405, 629
treatment with bananas, 404, 901
treatment with saline solutions in infancy, 1393
Diathermy: See under names of diseases, organs and regions; etc.
Diathesis, Allergic: See Anaphylaxis and Allergy; Asthma
exudative; constitutional anomalies, 1097
hemorrhagic; familial hemorrhagic condition of unusual type, 132
hemorrhagic; hereditary pseudohemophilia, 1377
hemorrhagic; reticulo-endothelium of spleen in essential thrombopenia, 1381
Dick Test: See under Scarlet Fever
Diet and Dietetics: See also Food; Infant Feeding; Nutrition; Vitamins; and under names of various diseases and foods
dietetic treatment of eczema, *344
free school meals, rationale of, 357
in relation to physical efficiency, 356
old and new problems in dietetics, 854
self-selection by rats, 1180
sport and nutrition, 854
Teeth and Diet: See under Teeth
utilization of organic and inorganic iron by normal infant, *252
voluntary food habits of normal children, 356
Dietrich, H. F.: Sodium mandelate as urinary antiseptic, *496
Digestive Tract: See Gastro-Intestinal Tract; Intestines; Stomach; etc.
Digitalis, Therapy: See under names of various diseases, as Diphtheria
Diphtheria and tonsillectomy, 121
bacilli; cultures taken every 2 hours for diphtheria patients and carriers; results, 1113
bacilli; different forms of C. diphtheriae; significance, 871
bacilli, experimental researches on reciprocal action of diphtheria bacilli and human leukocytes in presence or absence of antitoxin, 1109
bacilli found in diphtheria carriers, pathogenicity of, 375
bacilli; genesis of diphtheria; virulence of types of bacilli, 607
bacilli; relation between clinical types of diphtheria and cultural types of C. diphtheriae, 372
bacilli; types of C. diphtheriae, 118, 1112
bacilli; types of C. diphtheriae in Cape Town, 1362
bacteriologic examination; what may practitioner expect from bacteriologic examination in cases of suspected diphtheria? 1113
blood sugar curve in diphtheric infections, 119
carriers, pathogenicity of diphtheria bacilli found in, 375
carriers, use of arsenicals for, 1109
circulatory collapse in, *1066

Diphtheria—Continued
complicated by sinus arrhythmia; electrocardiographic studies of cardiac function, 1109
complications; paralysis of plexus brachialis during postdiphtherial polyneuritis, 1113
concurrent diphtheria and varicella with hemorrhagic features; report of case, 870
conjunctival; diphtheric conjunctivitis in infant, 1364
course of; does clinical course correspond to type of bacilli? 1364
epidemic of 1935, 120
facial phenomenon in, 1112
fight against, 1365
immunity; action of homologous and heterologous serums, 373
immunity; active immunization, 606
immunity and antitoxin content of blood, 874
immunity; course of passive immunity after treatment with antidiphtheria horse serum, 608
immunity; duration after prophylaxis, 1361
immunization, *975
immunization; history and frequency of diphtheria immunizations and cases in 9,000 families, 1105
immunization of hypophysectomized dogs with diphtheria antitoxin, 873
immunization; report by local board of health, Hindmarsh, Australia, 1108
intestinal, 373
laryngeal, treatment of, 871, 1363
malignant; is disease picture of "malignant diphtheria" caused only by diphtheria bacilli? 1364
malignant; treatment with blood transfusions, 374
of lips, 875
Paralysis Following: See Paralysis, diphtheric
prevalence, trends in, 116
Schick reaction, effect of simple serum on, 374
Schick reaction modified by addition of normal horse serum, 121
Schick test, allergic reactions to, 371
Schick test in poliomyelitis, *999
Schick test; pseudoreaction and tuberculosis, 384
susceptibility; is there relation between resistance and susceptibility to poliomyelitis and diphtheria? 605
susceptibility of children with scarlet fever to, 873
toxin, detoxified with stearines, 1113
toxin; effect of chemical constitution of soaps on action on diphtheria toxin, 1103
toxin; effect of diphtheria toxin and "gangrene" toxin in guinea-pig, 121
toxin; effects of bacterial toxins placed in middle ear, 891
toxin, paralytic manifestations in smooth muscle of guinea-pigs poisoned with, 1364
toxins and toxoids; concentration and purification by ultrafiltration, 851
toxoid; immunizing properties of undiluted and diluted diphtheria formoltoxoid, 606
toxoid, multiple neuritis from; report of case, 1104
treatment; action of hormone of adrenal cortex on diphtheric intoxication, 1110
treatment with various drugs, *1066
urea deposition in brain in, 607
vulvar, primary, of external genitalia of young girls, 873
Diplegia: See Paralysis
Directory of pediatric societies, 202, 452, 692, 966, 1204, 1432
Dislocations: See under names of joints
Distomiasis; clinical studies on human lung fluke disease; endemic hemoptysis caused by P. Westermanii infestation, 1115
Diuresis and Diuretics: See also Diabetes Insipidus; Kidneys; etc.
influence of cevitamic acid on, 1351
Diverticulum, Meckel's: See Intestines, diverticula
Donaggio Reaction: See Urine, examination
Dooley, P.: Serologic variation in strains of Shigella in relation to human infection, 1176
Drainage: See under Antrum; etc.
Drake, T. G. H.: Comparative value of spinach and tomatoes in child's diet, 684, 946
Drugs, effect of toxic substances on blood-forming organs, 618
pediatric therapeutics, 180
pharmacology and pharmacodynamics of childhood; hypnotics, 942
thymus and adrenals in response of organism to intoxications, 163
Duodenum, megaduodenum, 1392
stenosis, 630
stenosis in infant; case report, 145
stenosis; infantilism and stunted growth in duodenal stenosis and development of rickets during increased growth after gastro-enterostomy, 408
Ulcer: See Peptic Ulcer
Dust; house dust as cause of asthma, 1412
house dust hypersensitivity in perennial asthma of childhood, 663
house dust; rôle in bronchial asthma, 1387
Dwan, P. F.: Four lead electrocardiogram of children, *265
Dwarfism: See also Achondroplasia
growth rates, osseous development and mental development in cretins and dwarfs, 193
hepatic, and glycogenosis (von Gierke's disease); case of pathologic storage of glycogen; clinical features of glycogenosis, 409
renal; infantilism with bony changes resembling rickets and calcification in kidneys, 1162
renal; renal rickets, 1155
Dyes in clothing causing eczema; report of 15 cases, 659
Dyscephalodactylia: See Cranium, abnormalities; Fingers and Toes, abnormalities
Dysentery: See also Diarrhea
bacillary, influence of air conditions on incidence of, 673
bacillary, treatment of, 1120
food-borne outbreaks of gastro-enteritis, 1142
forms of; principles of treatment, 879
prevention, therapy and epidemiology; trends since discovery of causative organism, 1118
serologic diagnosis in nurslings and small children, 374
serologic variation in strains of Shigella in relation to human infection, 1176
Dysostosis: See Bones, growth; Schüller-Christian Syndrome
Dyspepsia of Scheer, agar-milk treatment of, 854
Dysplasia Periostei: See Bones, fragility
Dyspnea, treatment with helium, 670
Dystonia musculorum deformans; progressive unilateral rigidity with choreo-athetosis and torsion spasms about longitudinal axis, 638
musculorum deformans; torsion spasm in child, 153
Dystrophy: See also under Arteriosclerosis; Bones, atrophy; etc.
Adiposogenital: See Laurence-Biedl Syndrome; and under Pituitary Body
bullous, hereditary, macular type of, 937
dystrophies in infants, 1086
muscular, progressive, 654
muscular, progressive, creatinuria in; treatment, 1163
muscular: progressive pseudohypertrophic muscular dystrophy, hereditary aspect of, 165

Ear: See also Deafness; etc.
dermoid teeth in external auditory canal; comments on teratomas and dermoids, 622
Diseases: See Meningitis, otitic; Otitis Media
external auditory meatus, congenital abnormalities of; squamous cell epithelial cyst of tympanic membrane, 1385
internal, and hydrocephalus, 639
internal; labyrinthitis secondary to meningococcic meningitis, 868
middle, acute streptococcic infection of, 395
middle, effects of bacterial toxins in, 891

Ear—Continued
sound feeling in deaf-mutes, practical significance of, 893
treatment of inflammatory conditions of external auditory canal with brilliant green, 141
tympanic membrane, squamous cell epithelial cyst of; congenital abnormalities of external auditory meatus, 1385
Echinococcosis: See also under names of various organs, as Liver; etc.
hydatid disease in children, 1119
Economic conditions; depression children, 106
Ectopia Cordis: See Heart, displacement
Lentis: See under Lens
Eczema, 1411
dietetic treatment of, *344
due to dyed clothing; report of 15 cases, 659
eczematizing properties of soaps, 174
infantile, and food allergy, 438
infantile, probable etiologic factor in; based on roentgen examinations of gastro-intestinal tract, 164
infantile, prophylaxis of; diet of expectant mother, 662
infantile; relation to specific ingesta, 662
infantile; treatment with maternal blood, 664
of internal origin, 935
sensitivity to cow's milk in infants with, 448
theoretical considerations and contributing factors, 1167
treatment of infant with splenic extract by mouth, 664
vaccinatum, 1101
Edema: See also under Elephantiasis; etc.
and hypothermia, 937
angioneurotic; allergic edema (Quincke) with necrosis, 937
congenital, erythroblastosis in new-born with, 1358
in new-born due to prelacteal feeding; report of 4 cases, 1098
test of Aldrich and McClure in children; effect of heliotherapy, 671
Edmunds, C. W.: Circulatory collapse in diphtheria, *1066
Education and Training: See also Schools
utilization of play in construction of healthy mental attitudes, 644
utilization of time to best advantage, 1403
Egypt; parasitic infestation of infants and children in Egypt, 1121
pediatric practice in Cairo for 15 years, 1417
Ehlers-Danlos Syndrome: See Joints, abnormalities; Skin, abnormalities
Elbow, fracture; method of continuous and progressive traction in fractures about elbow, 938
Electrocardiogram: See under Heart
Electrolytes; effect of hyperthermia on distribution of water and electrolyte in brain, liver and muscle, 183
metabolic studies of changes in body electrolyte and distribution of body water induced experimentally by deficit of extracellular electrolyte, 851
Electrophoresis: See Erythrocytes
Electropyrexia: See Fever, therapeutic
Elephantiasis; lipoma of thumb and index finger resembling elephantiasis, 438
Embryonic Extracts: See Tissue, extracts; etc.
Emesis: See Vomiting
Emotions and instinctual factors in diabetes mellitus, 1157
emotional aspect of childhood in relation to practice of pediatrics, 1401
emotional factors in mental retardation: reading problem, 642
influence of emotional shock on psyche of children, 1152
Emphysema, subcutaneous, in course of uncomplicated measles, 606
surgical, spontaneous in children, 627
Empyema, acute, 625
acute, in contagious diseases, 397
causing allergic edema (Quincke) with necrosis 937
chemotherapy (sulfanilamide) in treatment of streptococcic infections of lung, pleura and chest wall, 951
Empyema—Continued
complications, unusual, 897
in children, 1141
in children; 10 year study, 397
pediatrician's viewpoint, 398
surgical treatment of, 1387
Emulsification of fat for intravenous administration, 592
Encephalitis: See also Encephalomyelitis; Meningo-Encephalitis
acute cerebral tremors in, 1150
acute, primary; clinical studies, 1151
acute, primary (not epidemic), in children, 153
associated with pneumonia; 2 cases, 152
complicating measles, 1111
epidemic, combined with multiple sclerosis, 908
epidemic, (St. Louis type) in Toledo, Ohio, 634
following German measles, 117
in measles, 1362
lethargic; prognosis in childhood, 634
periaxialis; familial Schilder's disease, 1148
periaxialis; progressive symmetrical familial centrolobar leuko-encephalosis (Schilder's disease), 908
postvaccinal; clinical observations, 375
postvaccinal, in infants, 1109
postvaccinal; neurotropic infections in children, 606
prevention of intranasally inoculated encephalitis (St. Louis type) in mice and of poliomyelitis in monkeys by means of chemicals instilled into nostrils, 97
sequel; precocious genital development of postencephalitic origin, 430
sequel; tics, obsessions and excessive stature of encephalitic origin, 152
Encephalitozoon, granulomatous encephalomyelitis due to; new protozoan disease of man, 1196
Encephalography: See under Brain
Encephalomeningitis: See Meningo-Encephalitis
Encephalomyelitis, 637
during and after measles, 1110
granulomatous, due to encephalitozoon; new protozoan disease of man, 1196
in scarlet fever, 1363
Endarteritis obliterans in infant girl, 442
Endocarditis, bacterial, acute, in infants; report of case, 389
bacterial, subacute, 947
bacterial, subacute, due to hemolytic parainfluenza bacillus, *1311
bacterial, subacute; relation of strains of green streptococci to clinical character of endocarditis, 133
lenta in childhood, 392
Rheumatic: See under Rheumatic Fever
septic, 618
Endocrine Glands: See also Endocrine Therapy; Hormones; Metabolism; and under names of glands
disorders, organotherapy in mental retardation associated with, 416
disorders; physical methods of endocrinotherapy, 652
disturbances; relation to certain heredodegenerative symptoms, 194
maternal; effect of functional disturbance on genital glands of female fetus, 1160
pathologic anatomy of endocrine systems of fetus and of new-born: fetal endocrinology, 653
present position of endocrinology, 427
present status of endocrinology in relation to child, 1158
secretions and iodine of blood in young organism, 429
stimuli influencing endocrine glands, fundamental factors in interpretation of, 423
symposium, 922
Endocrine Therapy: See also under names of diseases, glands, hormones and organs
antigonadotropic substances, nature of, 421
organotherapy in mental retardation associated with endocrine and nonendocrine conditions, 416
Endotoxin: See under Meningococci

Enemas; value of rectal administration of dextrose, 102
Enteritis: See under Diarrhea; Dysentery; Gastro-Intestinal Tract; Intestines; etc.
Enterocolitis: See under Intestines
Enuresis: See Urination, incontinence
Epidermolysis bullosa hereditaria dystrophica localisata, 665
Epilepsy: See also Convulsions
age incidence of, 413
and hereditary disposition; incidence of epilepsy in similar monozygotic twins, 1398
and hereditary syphilis, 414
and law of eugenics, 639
associated with cerebral frontal agenesis, 411
calcium content of blood serum during convulsion, 411
changes in biologic properties of cerebrospinal fluid in, 1400
combined with calcified intracranial hemangioma; case report, 155
epileptic syndrome relieved by lysis of pacchionian granulations; 3 cases, 633
hereditary factor in, 909
Jackson's, in infant with angiomatous nevi on face, 642
petit mal in children, 410
petit mal in; syndrome of pyknolepsy, 1150
treatment with (moccasin) snake venom, 1396
Epinephrine, Therapy: See under names of various diseases, as Diphtheria
Epiphyses; operative versus manipulative treatment of slipped femoral epiphysis, 654
Epip'oic Appendices: See Intestines
Epithelioma: See Cancer
Epithelium: See under Ear; etc.
Epituberculosis: See Tuberculosis, pulmonary
Epstein, I. M.: Infection of lower part of genital tract in girls, *459
Erb, I. H.: Neuroblastoma of adrenal medulla, 958
Ergosterol, Irradiated: See Viosterol
Erickson, B. N.: Lipid partition of erythrocyte stroma, 1192
Erysipelas, biologic relation to scarlet fever, 1106
treatment in infancy with derivative of sulfanilamide, 1120
treatment with ultraviolet light, 870
Erythema annulare, case of, 936
multiforme haemorrhagica, 662
nodosum and pulmonary tuberculosis, 613
nodosum associated with scarlet fever, 665
nodosum, etiology of, 664
nodosum in childhood, 1413
nodosum, meningeal reactions in, 1168
nodosum, "tuberculin-negative," 130
nodosum, tuberculous bacillemia in subjects suffering from, 613
nodosum with negative tuberculin tests, 937
Erythroblastosis: See Hematopoietic System, diseases; Pseudoleukemia, infantile
Erythrocytes: See also Anemia; Blood; Hemoglobin; Polycythemia; etc.
diameter of, 391
disintegration, influence of copper on rate of, 610
electrophoretic mobilities and sedimentation velocities of red cells from normal and pregnant human beings, 132
lysis; natural hemolysis from rat producing nuclear lysis of chicken erythrocytes, 1080
maturation of red cells, 953
red blood cell picture in healthy infants, 1382
red cell counts and hemoglobin values of premature infants and twins compared with those of full term children, 887
red cell volume determinations with use of capillary blood, 886
Sedimentation: See Blood, sedimentation
stroma, lipid partition of, 1192
vegetative regulation of red blood cells, 889
Erythroderma desquamativa (Leiner); treatment with vitamin D, 666
family with erythrokeratoderma variabilis, 1170
Erythrophagocytosis in anemia of new-born; 2 case reports, 1191
Esophagus, atresia, congenital, 902
diverticula, 147
injuries, 403
stenosis, transdiaphragmatic and subdiaphragmatic; extramucous esophagotomy followed by cure in child, 146
Estrogens: See also Hormones, sex; Ovary, hormone; Pregnancy, urine in
activities of some synthetic phenanthrene compounds and some oxidation products of theelol, 1158
female sex hormones; effect of pregnancy and of female sex hormones in modifying course of syphilis in experimental animals, 1122
keratinization test in castrated female rats after injections of estrogen, 1408
treatment of gonorrheal vulvovaginitis in infants with estrogen, 1405
Estruation; experimental studies of anterior pituitary; replacement capacity and moncyclic behavior of homoplastic grafts, 1158
Ethmoid Sinus: See also Sinuses, nasal
ethmoidal suppuration with orbital involvement, 396
Eugenics, outlook in preventive medicine, 941
Euglobulin: See Blood, proteins
Eustachian tube, frequency and effect of residual lymphoid tissue in nasopharynx on, 392
Ewing's Sarcoma: See Sarcoma
Exanthem, Subitum: See Roseola
Exanthems: See Communicable Diseases; and under names of exanthematous diseases
Exercise: See also Athletics; Physical Education
and heart; electrocardiographic and roentgen study of responses of healthy and diseased hearts, 1379
Exomphalos: See Hernia, umbilical
Exostoses, multiple, in case of osteogenic disease, 656
Extremities, paralysis; spasmodic paraplegia with cerebral disturbance in congenital syphilis, 884
Eyelids, coloboma, congenital, surgical treatment of, 436
conjunctivopalpebral tumor (dermolipoma) of exceptional development in new-born, 1358
Eyes: See also Orbit; and under names of special structures and diseases of eyes
abnormalities; heredity and consanguinity in ophthalmology, 437
acid and alkali burns of, 71
allergy of, 1136
and sport, 934
anomalies; morphology and development of anomalies occurring in microphthalmos, 171
diseases; hypodermic injections of carotene in treatment of phlyctenular conditions and vitamin A deficiency diseases in ophthalmology, 437
eyelash successfully removed from posterior chamber, 172
microphthalmos and persistent truncus arteriosus communis, 1096
paralysis; congenital familial ophthalmoplegia, 931
relation of hypovitaminosis to dark adaptation, 105

Faber, H. K.: Localization of lesions of poliomyelitis as visualized by intravital staining, 680
Face, Paralysis: See Paralysis, facial
Failot's Tetralogy: See Heart, abnormalities
Farber, S.: Experimental pulmonary edema, 1194
Farmer, C. J.: Cevitamic acid content of blood plasma, 682
Fasting, respiratory quotient during, 1188
Fat: See also Lipoids
absorption from milk by premature infants, *1039
effect of beta-lactose and fat on flora of infant's stool, 590
emulsification for intravenous administration, 592
origin of fecal fat in absence of bile; studies with deuterium as indicator, 898

Feces, Bacteria in: See Intestines, bacteria
effect of beta-lactose and fat on flora of infant's stool, 590
Fecundity; relation of fertility to social conditions, 858
Feeblemindedness: See also Idiocy; Laurence-Biedl Syndrome; etc.
and girdle type of adiposity among males, 1257
in gargoylism, 601
mental deficiency in theory and practice, 417
mental retardation and juvenile delinquency, 913
organotherapy in mental retardation associated with endocrine and nonendocrine conditions, 416
physical and mental retardation; probable rôle of attempts at abortion, 182
psychology of subnormal persons, 643
relation between enlarged tonsils and mental deficiency, 1153
relation between rickets and mental deficiency, 1153, 1354
social adaptation of persons with abnormalities of intelligence and character, 1153
speech defect in abnormal children, 915
Feet: See Foot
Feil-Klippel Syndrome: See Spine, abnormalities
Femur, abscess simulating a cyst, 1162
Epiphyses: See Epiphyses
fracture in children, 1170
fracture; spontaneous restoration of normal shape of femur after healing of fracture in position of flexion; case in new-born, 113
osteochondritis of lower end of femur in child aged 5 years, 433
Ferrous Gluconate: See under Anemia
Fertility: See Fecundity
Fetus, blood destruction in, 114
deformities of mechanical origin, 363
ectopic; changes in transplanted ectopic fetus, 1356
effect of functional abnormality in maternal pancreas on genital gland of female fetus, 1160
effect of functional disturbance of maternal endocrines on genital glands of female fetus, 1160
electrocardiograms derived from 11 fetuses through medium of direct leads, 131
endocrinology; pathologic anatomy of endocrine system of fetus, 653
fixation of head during pregnancy, 113
hernia into umbilical cord and related anomalies, 600
intra-uterine carbohydrate metabolism, 595
mineral composition of bone and cartilage of, *1025
mineral content of; mineral storage, 686
mortality; recommendations for reduction, 1354
Pathology: See also Achondroplasia; Hydrocephalus; etc.
pathology; effect of hypertension and hypotension of maternal hypophysis on genital gland of female fetus, 1160
pneumonia in fetus causing congenital atelectasis, 626
viability when umbilical cord is nonpulsating, 114
Fever: See also Malaria; Typhoid; etc.
Alimentary: See Nutrition, disturbances
cryptogenic, and mastoiditis duplex, 396
obscure, Vincent's stomatitis as cause of, 1391
symposium on fevers of obscure origin in childhood, 876
Therapeutic: See also under Chorea; etc.
therapeutic, complications and hazards of; analysis of 1,000 consecutive treatments with Kettering hypertherm, 1172
therapeutic; hyperpyrexia induced by hydrotherapy in treatment of chorea, 1147
Fibrinogen: See under Blood
Fibrothorax: See under Tuberculosis, pulmonary
Fingers and Toes, Abnormalities: See also Polydactylia
abnormalities; acrocephalosyndactylism in new-born; report of case, 1356
abnormalities; arachnodactyly and status dysraphicus; review, 1095
abnormalities; arachnodactyly, cases of, 1095
abnormalities; changes in iris caused by syphilis, with congenital ectopia lentis and arachnodactylia, 171
abnormalities; complete syndactylism of hands and feet, with other deformities, 1097
abnormalities; congenital partial gigantism, 1097
abnormalities; dyscephalodactylism (Vogt) and developmental anomalies of uveal tract, 108
abnormalities; genealogic study of case of symmetrical congenital brachydactylia, 601
abnormalities; hereditary luxation of lens and syndrome of Marfan, 170
abnormalities; persistent truncus arteriosus communis with polydactyly, 1096
abnormalities; syndactylia, treatment of, 1098
Clubbed: See also Osteo-Arthropathy, hypertrophic, pulmonary
clubbed; biliary cirrhosis with cyanosis and finger-clubbing, 900
clubbed; hippocratic fingers and Bamberger-Marie syndrome, 391
familial flexion contraction of fingers, 110
gangrene of fingers, 1100
lipoma of thumb and index finger resembling elephantiasis, 438
Finkelstein, H.: Dietetic treatment of eczema in infants and children, *344
Fischer, A. E.: Acute anterior poliomyelitis in New York in 1935; review of 686 cases, *984
Fisher, C. V.: Cryptococcic bronchopneumonia, *81
Fissure, anal, in childhood, *585
Fistula, branchial, and suprascapular cyst, 140
cervical; roentgenographic visualization of complete lateral congenital fistula of neck with iodized poppy-seed oil, 110
perineoscrotal, and imperforate anus, 603
Flatfoot: See under Foot
Flies and influence of air conditions on incidence of bacillary dysentery, 673
Fluids; effect of hyperthermia on distribution of water and electrolyte in brain, liver and muscle, 183
Fluorescence in study of lipoid cell pneumonia; new method of identifying oil in lung, 1195
Fluorides; chronic endemic dental fluorosis, 668
rate of apposition of enamel and dentin, measured by effect of acute fluorosis, *757
Fluorine: See under Fluorides
Folliculin: See Hormones, sex
Food: See also Diet; Nutrition; Vitamins; and under various foods, as Apples; Bananas; Cereals; Honey; Ice Cream; Legumes; Milk; Spinach; Tomatoes; etc.
Allergy: See also Milk, allergy
allergy; anaphylaxis from bananas, 1168
allergy and infantile eczema, 438
allergy in mild and severe cyclic vomiting, 144
allergy; mutual absorption tests with related foods, 1411
allergy; new phase of intestinal allergy, 1413
allergy, relation of rheumatism to, 879
allergy; roentgen studies of children with alimentary disturbances due to food allergy, *1239
allergy, thrombocytopenic purpura due to, 1130
and nutrition, 1084
cevitamic acid content of some common foodstuffs, 858
irradiated; photo-activity of foods irradiated by sun, 856
Poisoning: See also Salmonella
poisoning, food-borne outbreaks of gastro-enteritis, 1142
poisoning, staphylococcic; small milk-borne epidemic, 403

Foot: See also Fingers and Toes; Tarsus; etc.
deformities: clubhands and clubfeet with amyotrophic abnormalities in legs and arms, 938
flatfoot; treatment by exercise, 177
Gangrene: See Gangrene
"march foot," bilateral, 440
Foramen Ovale: See Heart, abnormalities
Foreign Bodies: See also under names of organs and regions, as Pericardium; Stomach; etc.
bronchial; artificial pneumothorax through piercing wound of bronchus caused by tack, 400
bronchial: second occurrence in 5 year old girl, 1138
in air and food passages, 1137
inspired foreign body in new-born, 141
pneumothorax due to aspiration of coffee bean or to its extraction, 897
tracheal; unusual foreign body in trachea, 396
Foster, C.: Effect of diet on resistance to infection; maternal diet, 1178
Fractures: See also under Cranium; Elbow; and under names of bones, as Femur
in new-born, 862
of upper part of arm; management in new-born, 1358
supracondylar, in children, 668
Friderichsen-Waterhouse Syndrome: See Adrenals, hemorrhage
Fries, J. H.: Roentgen studies of children with alimentary disturbances due to food allergy, *1239
Fröhlich Syndrome: See Laurence-Biedl Syndrome; and under Pituitary Body
Frontal bone, spreading osteomyelitis of, secondary to disease of frontal sinus; bacteriology and specific treatment, 1384
Fructose: See Levulose
Fruit, dried; influence on intestinal flora of white rats, 1391
Fungi: See also Actinomycosis; Ringworm; etc. rôle in acute diarrhea of infants, 1392
Furunculosis; treatment of staphylococcic skin lesions with toxoid, 174

Gallbladder, surgery; cholecystogastrostomy for cirrhosis with jaundice, 1392
Ganglion, sympathetic, cervical; importance in surgery, 667
Gangrene: See also under names of organs and regions, as Skin, gangrene
combined effect of diphtheria toxin and "gangrene" toxin in guinea-pig, 121
dry, of foot in new-born, 1358
due to endarteritis obliterans in infant girl, 442
Gargoylism: See Bones, atrophy
Gastric Juice: See Stomach, secretion
Gastro-Enteritis: See under Gastro-Intestinal Tract
Gastro-enterostomy followed by increased growth and rickets in child showing infantilism and stunted growth in duodenal stenosis, 408
Gastro-Intestinal Tract: See also Colon; Duodenum; Intestines; Stomach; etc.
acute gastro-intestinal disease in infants, 898
diseases; relation between diminished absorption of vitamin C and pathologic pigmentation in gastro-enteritis and achylia gastrica, 902
disorders; impaired dextrose tolerance in certain alimentary disorders of childhood; treatment with liver extract, 405
disorders; probable etiologic factor in infantile eczema; roentgen examinations, 164
disturbances in children; roentgen studies of disturbances due to food allergy, *1239
gastro-enteritis, food-borne outbreaks of, 1142
gastro-intestinal neuropathies in infancy, 1393
surgical diseases of alimentary tract in infants, 899
Gaucher's Disease: See Anemia, splenic
Gee's Disease: See Celiac Disease
Genitals: See also under names of genitals, as Testicles; Vagina; etc.
dystrophy; treatment with gonadotropic hormone (anterior pituitary-like) of nonadipose boys with genital dystrophy, 1406
Genito-Urinary Tract: See Genitals; Testicles; Vulva; etc.
Genius, unusual artistic ability in child, 156
Georgia Pediatric Society, meeting, 849
Germ plasm injury, heredity and constitution, 108
German, W. H.: Cutaneous infection in experimental poliomyelitis; neurosurgical studies, 679
von Gierke's Disease: See Glycogen, in liver and muscle
Gigantism, congenital, partial, 1097
Gipson, A. C.: Congenital stenosis of entire colon, *1320
Glands: See Endocrine Glands; Lymph Nodes; and names of individual glands
Glanzmann's Disease: See Purpura, hemorrhagic
Glass, G. C.: Hemorrhage in new-born, causing intestinal and biliary obstruction; report of case with necropsy, *1052
Glioma; congenital blindness (?) due to bilateral pseudoglioma, 435
of aqueduct of Sylvius, 903
retinal, treated by radon seeds, 657
retinal; treatment by fractionated or divided dose principle of roentgen radiation, 657
roentgenographic diagnosis of retinoblastoma, 169
syndrome of diffuse intraprotuberential glioepithelioma, 1398
Globulin fraction; immunologic potency of globulin fraction prepared by methyl alcohol precipitation, 591
Placental: See under Placenta
Glomerulonephritis: See under Nephritis
Glucose: See Dextrose
Glutathione and ascorbic acid in cow's milk in Manchuria and Mongolia, 359
Glycemia: See Blood, sugar
Glycogen and metabolism of carbohydrate, 357
in liver and muscle; glycogen storage disease, 1394
in liver and muscle; glycogen storage disease, carbohydrate hormone of anterior lobe of pituitary in blood in, 926
in liver and muscle; glycogenosis (von Gierke's disease); case of pathologic storage of glycogen; clinical features of glycogenosis and hepatic dwarfism, 409
in liver and muscle; hepatomegaly with disturbance of carbohydrate metabolism, 901
in liver and muscle; vital and postmortem carbohydrate metabolism in glycogenosis and disturbances of thyroid function, 1394
Glycosuria: See Dextrose, tolerance; Diabetes Mellitus; Urine, sugar
Gnats; endemic outbreak of skin disease caused by bites of Aedes cinereus, 439
Goettsch, A.: Dietary protein and regeneration of serum albumin, 685
Goiter: See also Thyroid
congenital, 1408
congenital struma, 11 cases of, 431
endemic and experimental, 427
endemic; relation to iodine contents of water, milk and pasture in 2 districts of England, 428
endemic; relation to traces of silver and barium in drinking water, 424
exophthalmic; hyperthyroidism in children, 1407
exophthalmic, surgical treatment of child with, 164
exophthalmic, tonsillitis and pharyngeal asphyxia in girl 4 years old, 429
Goldberger, E. W.: New tuberculin patch test, *1019
Goldbloom, A.: Chemotherapy (sulfanilamide) in treatment of streptococcic infections of lung, pleura and chest wall, 951
Osteomyelitis of superior maxilla in newborn, 954
Goldstein, H. I.: Scurvy with unusual symptom, 1344

Gonadotropic Substances: See under Hormones, sex; Pituitary Body; Pituitary Preparations; Pregnancy, urine in
Gonads: See also Endocrine Glands; Hermaphroditism; Ovary; Testicles
antigonadotropic substances, nature of, 421
Gonococci, culture: diagnosis of gonococcic infections by cultural method, 875
Infection: See under Arthritis; Gonorrhea
Gonorrhea, infection of lower part of genital tract in girls, *459
vaginitis, 157
vaginitis in children, ovarian hormone in treatment of, 160
vulvovaginitis and proctitis in children; bacteriologic cultures for diagnosis, 645
vulvovaginitis in infants; treatment with estrogen, 1405
vulvovaginitis of children, 1154
vulvovaginitis of gonococcic origin in infants; treatment, 918
vulvovaginitis treated with glucose tablet, 1403
Gordon, H. H.: Respiratory metabolism in infancy and childhood; nitrogen metabolism in premature infants; comparative studies of human milk and cow's milk, *1030
Granulocytopenia: See Angina, agranulocytic
Granuloma; granulomatous encephalomyelitis due to encephalitozoon; new protozoan disease of man, 1196
pyogenicum; rare localization of botryomycoma in 2 cases, 1170
Graves' Disease: See Goiter, exophthalmic
Grenz (Infra-Roentgen) Rays: See Roentgen Therapy
Groat, W. A.: Erythrophagocytosis in anemia of new-born; 2 case reports, 1191
Growth and development, rôle of thymus and pineal glands in, 921
biologic effects of thymectomy on; accruing retardation in growth in succeeding generations, 422
effect of pineal extract (Hanson); accruing retardation in growth and acceleration in development in successive generations of rats under continuous treatment with pineal extract, 422
effect of thyroid on nitrogen balance in period of growth, 1191
influence of raw and sterilized milk on growth of rats, 106
Moro reflex and, *240
pituitary growth factor, 920
relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
relation of physical defects to growth of children of 21 states, 106
relation of physical defects to nutritional impairment: examination of 30,000 children of 21 states, 599
retardation of statural growth and hepatomegaly in diabetic child, 1143
stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants: basic study, *726
substances promoting normal and abnormal growth, 362
Guild, H. G.: Unfamiliar rachitic syndrome, 1186

Habit; meaning of children's habits, 912
Hair; bacterial flora in children's hair, 1414
Ball: See Stomach, foreign bodies
Hallervorden-Spatz Disease: See Lenticular Nucleus, degeneration
Hamil, B. M.: Relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
Stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants: basic study, *726
Hamilton, B.: Effect of citrate and tartrate on experimental rickets, *548
Hand, deformities; clubhands and clubfect with amyotrophic abnormalities in legs and arms, 938
tuberculosis of: roentgen treatment, 614
Hand's Disease: See Schüller-Christian Syndrome
Harden, A. S., Jr.: Sickle cell anemia; changes in vessels and bones, *1045
Hardy, L. M.: Cryptorchidism treated with gonadotropic hormones, 190
Harelip, 601
in children's surgical clinic, 440
Hart, A. P.: Presidental address on hobbies, 944
Hay Fever: See also Anaphylaxis and Allergy; Pollen; Rhinitis
blood constituents in pollenosis with and without treatment, 663
blood sugar studies in, 895
lipids of blood plasma in, 1411
ragweed hay fever resort areas of North America, 1412
treatment, 664
Head: See also Cranium
neoplastic extracranial tumor of new-born, 603
Health Centers: See under Public Health
Health Resorts; hepatic insufficiency in childhood; treatment at Pougues-les-Eaux, 147
ragweed hay fever resort areas of North America, 1412
Hearing: See also Deafness
audiometric studies on school children, 395
average range of acuity of hearing of high school pupils, 891
Heart: See also Arrhythmia; Endocarditis; Myocarditis; Pericarditis; and under names of various conditions, as Rheumatic Fever, heart in; etc.
abnormalities and complete syndactylism of hands and feet, 1097
abnormalities; congenital malformations due to defective development of right ventricle, with tricuspid atresia of hypoplasia, 615
abnormalities; congenital tricuspid atresia, 617
abnormalities, hemiplegia in heart disease, 1380
abnormalities; morphologic significance and development of malformations of human heart, 137
abnormalities; persistent truncus arteriosus communis, 1096
abnormalities; progress in recognition of congenital heart disease, 617
abnormalities; widely patent foramen ovale; case report; diagnosis, 389
abnormalities, with congenital aortic atresia, 389
acardia, 364
adhesions; experimental study of cardiopericardial adhesions, 134
athletics and; electrocardiographic and roentgen study of response of healthy and diseased hearts to exercise, 1379
block, congenital, 391
carditis and scurvy, 1351
changes in shape and size of heart in renal disease, 1156
circulatory system disturbances due to pneumonia and other toxic conditions, 619
damage, various activities of beating heart after, 1130
disease; cardiac function in; estimation by simple clinical methods, 1129
disease, congenital, and 4 lead electrocardiogram of children, *265
disease, congenital, associated with cyanosis and polycythemia, 391
disease in children; age at onset and at recurrences in 488 cases of juvenile rheumatism ushered in by major clinical manifestations, 1129
disease; relation of nutritional deficiencies to development of heart failure in organic heart disease, 133
disorders; early recognition of cardiac impairment, 947
disorders, not the cause of bowing of the pulmonary artery in children, 621
disorders, unusual form in child, 138
displacement; complete transposition of viscera, 1356

Heart—Continued
displacement; dextrocardia associated with total inversion of viscera, 391
displacement; dextropositio cordis in relation to pneumothorax and pulmonary atelectasis in new-born, 369
displacement; ectopia cordis cum sterni fissura, 107
electrocardiograms derived from 11 fetuses through medium of direct leads, 131
electrocardiograms; 4 lead electrocardiogram of children, *265
electrocardiograms; lead IV in children, with reference to direction of excursion of T wave, 131
electrocardiographic characterization in old age and childhood, 1381
electrocardiographic studies of cardiac function in sinus arrhythmia of diphtheria, 1109
hypertrophy, 135
hypertrophy in case of Cooley's anemia, 388
hypertrophy; reversion of cardiac enlargement in 4 year old child after treatment for avitaminosis, 1132
murmur; unusual extracardiac murmur simulating organic heart disease, 615
murmurs, precordial, in children; significance and differential diagnostic test of precordial murmurs in children, 1130
outline, 135
rate; paroxysmal atrioventricular nodal tachycardia in new-born, *557
rate; paroxysmal tachycardia in child of 3 years, 1135
rate; treatment of paroxysmal tachycardia with acetylcholine, 890
size, influence of heredity and environment on; investigations based on twins, 885
sound, gallop rhythm and physiologic third heart sound, 136
Valves: See also under names of valves
valves; blood cysts in, 1379
Heat, effect of hyperthermia on distribution of water and electrolyte in brain, liver and muscle, 183
Production: See Metabolism
Hecker, A. O.: Girdle type adiposity among mentally deficient males, *1257
Height: See under Body
Heine-Medin Disease: See Poliomyelitis
Heisler-Moro Diet: See Apples
Heliotherapy: advantages of moderately high altitude for childhood diseases, 1086
and physical education, 1174
test of Aidrich and McClure in children; effect of heliotherapy, 671
Helium, therapeutic use of, 670
Helmholz, H. F.: Infection of renal parenchyma from pelvis of kidney, *1
Helminths and Helminthiasis: See Intestines, parasites; Screw Worms; etc.
Hemangioblastoma: See Angioma
Hemangioma: See Angioma
Hematoma: See Meninges, hemorrhage
Hematopoietic System: See also under Blood; Erythrocytes
Diseases: See also Anemia; Leukemia; etc.
diseases; kernicterus (Orth-Schmorl) with and without erythroblastosis in new-born, 367
diseases; secondary or symptomatic erythroblastosis, 888
diseases; sternal marrow puncture, *209
effect of toxic substances on blood-forming organs, 618
vegetative regulation of red blood cells, 889
Hematuria complicating acute ear, nose and throat infections, 138
Hemiplegia in heart disease, 1380
Hemochromatosis and heredity, 135
Hemoglobin: See also Anemia; Blood; Erythrocytes; etc.
metabolism in infants and normal children, 594
metabolism in normal new-born, 864
values and utilization of organic and inorganic iron by normal infant, *252
values for premature infants and twins compared with those of full term children, 887
Hemolysin, natural, from rat producing nuclear lysis of chicken erythrocytes, 1080
Hemophilia; *713, 1378. See also Diathesis, hemorrhagic
in Negro, 614
paralysis associated with, 889
treatment; new method, 619
unexpected cause of death in hemophilic infant, 621
Hemorrhage: See also Blood, coagulation; Hemophilia; Purpura, hemorrhagic; etc.
and vitamin C, 105
effect of acute hemorrhage on emptying time of stomach, 898
in New-Born: See under New-Born Infants
subaponeurotic, involving left posterolateral aspect of head; unusual symptom of scurvy, *73, 1420
Hemorrhoids in childhood, *586
Hemotherapy: See Serotherapy and Hemotherapy
Hemphill, E. H.: Effect of lyophil pooled adult serum administered by mouth on positive Dick test as compared with other methods of administration, 1177
Heparin for sedimentation reaction in pediatrics, 1382
Hepatitis: See Jaundice; Liver
Hepatomegaly: See under Liver
Heredity and consanguinity in ophthalmology, 437
constitution and injury to germ plasm, 108
role of heredity in practice of pediatrics, 944
Hermaphroditism; excess of "male" (comb-growth and prostate-stimulating) hormone in pseudohermaphroditism, 422
external masculine pseudohermaphroditism, 419
true, case of, 161
Hernia, diaphragmatic, and thoracic stomach with short esophagus, 1141
diaphragmatic, complicated by volvulus of inverted intrathoracic stomach; case report, 1389
diaphragmatic; congenital absence of pericardium; report of case, 1132
diaphragmatic; hernia of stomach in child, 1144
diaphragmatic, massive, congenital, 1419
diaphragmatic, strangulated, clinical diagnosis of, 177
mesenteric; acute intestinal obstruction following hernia into ascending mesocolon, 1171
strangulated; peculiar case of ileus in newborn, 410
umbilical and related anomalies, 600
umbilical; case of fetal hernia, 901
umbilical; exomphalos associated with volvulus neonatorum; result 6½ years after operation, 1392
Herpes, antiviral property of human blood; relation to sex, pregnancy and menstruation, 355
Zoster: See also under Chickenpox
zoster, ophthalmic, 1166
zoster ophthalmicus preceded by ocular symptoms, 931
zoster, problem of, 1169
Herter-Gee's Disease; See Celiac Disease
Hill, L. W.: Sensitivity to cow's milk in infants with eczema, 448
Hip Joint, Deformities: See Osteochondritis deformans
dislocation, congenital, 667, 1170
dislocation, congenital; new transformable chair for use in treatment of, 1162
von Hippel's Disease: See Retina, tumors
Hippocratic Fingers: See Fingers and Toes, clubbed
Hirschsprung's Disease: See Colon, dilatation
Histiocytoma: See Reticulo-Endothelioma
Hobbies, 944
Hodgkin's Disease: See Lymphogranuloma
Hogs: virulent tubercle bacilli recovered from tissues of swine intended for food, 382
Holt, L. E., Jr.: Self-selection of diets by rats, 1180
Honey; infantile diarrhea treated with substances extracted from honey, 1145

Hookworm Infestation, 126
incidence and severity in eastern part of Texas, 1365
Hormones: See also Endocrine Glands; and under names of organs, as Parathyroid; Pituitary Body; Thyroid
correlation between blood pressure and hormonal secretion in children, 889
Sex: See also Pituitary Preparations; and under names of organs, as Ovary; Pituitary Body; Testicles; etc.
sex; cryptorchidism treated with gonadotropic hormones, 190
sex; demonstration of follicle-stimulating hormone in human colostrum, 853
sex; estrogen and theelin used in infection of lower part of genital tract in girls, *459
sex; impairment of anterior pituitary functions by folliculuar hormone, 427
Hospitals, children's, prevention of cross-infection in, 670
Huggins, C.: Sympathetic innervation of external sphincter of human bladder, *1012
Humerus, fracture in new-born, radial paralysis due to, 367
osteochondritis of capitellum, 433
Hungary, child hygiene in, 362
scientific and social development of pediatrics in Hungary as seen by Italian pediatrician, 942
Hunter, W. B.: Influence of air conditions on incidence of bacillary dysentery, 673
Hutinel's Disease: See Liver, tuberculosis
Hyaline bodies of disk, heredity of, 1166
Degeneration: See Degeneration, hyaline
Hydatid Cyst: See Echinococcosis
Hydrocephalus and internal ear, 639
in twins; heredity, 1400
internal, and ventricular communication as complications of brain abscess, 637
internal, mechanism of hydrocephalus in spina bifida, 904
physiopathologic changes in intracranial pressure associated with production and resorption of spinal fluid, 906
reducing substance in ventricular and spinal fluid of hydrocephalic children, 415
with spina bifida, 414
Hydrophobia: See Rabies
Hydrophthalmos, pathogenesis of, 933
Hydrotherapy: See under Arthritis; Health Resorts; etc.
Hyland, C. M.: Human convalescent serum in prevention and modification of measles, *277
Prophylactic and therapeutic use of scarlet fever convalescent serum, *504
Hypercholesteremia: See Blood, cholesterol
Hyperglycemia: See Blood, sugar; Diabetes Mellitus
Hyperparathyroidism: See under Parathyroid
Hyperpyrexia: See Fever
Hypertelorism of Greig, paretic and hereditary type, 602
Hypertherm: See Fever, therapeutic
Hyperthyroidism: See under Goiter; Thyroid
Hypertrophy: See under names of organs and regions
Hypocholesteremia: See Blood, cholesterol
Hypogenitalism: See Pituitary Body, diseases
Hypoglycemia: See Blood, sugar
Hypophysis: See Pituitary Body
Hyposnadias and macrogenitosomia praecox: Pellizzi's syndrome, 1405
Hypothyroidism: See under Thyroid
Hypotrophy: See Nutrition, disturbances
Hysteria in children, 156

Ice cream, source of staphylococcic food poisoning: small epidemic, 403
Ichthyosis, congenital; collodion skin, 173
nigricans, 1414
Icterus: See Jaundice
Idiocy: See also Feeblemindedness
amaurotic; relation between Tay-Sachs' and Niemann-Pick's disease; biochemical mechanism of processes, 620
and endemic occurrence of warts, 439
development of speech in oligophrenic child, 653
Mongolian: See Mongolism
Ileitis: See under Intestines
Ileum: See under Intestines
Ileus: See Intestines, obstruction
Imbecility: See Idiocy
Immobilization, prolonged, and urinary tract complications, 158
Immunity: See also Anaphylaxis and Allergy; Antigens and Antibodies; Diphtheria, immunity; Serum; etc.
and vitamins, 598
comparative study of immunization, *973
effect of lyophil pooled adult serum administered by mouth on positive Dick test as compared with other methods of administration, 1177
maternal diet and resistance to infection, 1178
Impetigo contagiosa, treatment in childhood, 439
neonatorum, congenital pemphigus neonatorum, 110
vulgaris differentiated from stomatitis aphthosa with cutaneous anomalies, 632
Inanition: See Nutrition
Indians, American; trachomatous keratitis; biomicroscopic study of 280 Indian school children, 1164
Infant Feeding, 103. See also Diet; Nutrition; Vitamins; and under names of various foods, as Milk; etc.
after sixth month, 358
beta-lactose and fat; comparison of effects on flora of infant's stool, 590
breast feeding; public health point of view, 356
food requirements of young infants, 194
hospital service to enable healthy infants to nurse their sick mothers, 1174
iron retention in infancy, 1347
powdered legumes in, 1085
regimen without milk or poor in milk during infancy; indications, 853
special hydrating solution in, 1083
total organic acidity and lactic acid of blood serum in feeding problems, 1085
vitamin C content of food available for young infants, 1352
Infant Mortality: See also New-Born Infants; Premature Infants
aspiration of amniotic fluid; importance as cause of death, 368
declining birth rate in Wales and southern part of England, 600
in Austria, 363
in Sudetenländern, 1355
neonatal mortality; recommendations for reduction, 1354
position of obstetrician concerning question of perinatal infant mortality, 1100
prevention of neonatal death, injury and disease, 604
reduction of, 1355
Infant Welfare: See also Child Welfare
maternal and child health work in South Carolina, 1096
mothers' milk available daily from Children's Welfare Federation, 356
Infantilism, Intestinal: See Celiac Disease
Pituitary: See Pituitary Body, disease
Renal: See Dwarfism, renal
Infants: See also Infant Feeding; Infant Mortality; Infant Welfare; New-Born Infants; Premature Infants; etc.
Diseases: See under names of various diseases
Growth: See Growth
Infection: See also Bacteremia; Immunity; Septicemia; under names of bacteria, organs and regions; etc.
bacterial resistance in B deficient dogs, 855
bactericidal power of whole blood in children with various infectious diseases, influence of vitamin A on, 1120
cytoplasmic and nuclear changes in neutrophils in severe infectious states, 389
effect of mucin on infections by bacteria, 355
immunologic specificity of staphylococci, 1080
lipid metabolism in infections of children, 1182
vitamin B and, *744

Infectious Diseases: See Communicable Diseases; Diphtheria; Typhoid; etc.
Influenza, Bacilli: See also under Meningitis
hemolytic para-influenza bacillus causing subacute bacterial endocarditis, 1311
immunization against, 678
Injections: See also Blood, transfusion; Enemas; etc.
intravenous; emulsification of fat for, 592
intravenous; factors influencing disposition of fluids given intravenously, 185
intravenous; saline solutions in diarrheas of infancy, 1393
intravenous; suggestions to facilitate venipuncture, 1417
intravenous; therapeutic value of various artificial solutions in infants, 181
intravenous; treatment of intoxication in infancy, 1085
intravenous; use of hypertonic saline solution in infants, 146
Injuries: See under Trauma; and under names of organs and regions
Insanity; congenital absence of vermiform appendix in patient with mental disease, 630
Insulin: See also under Diabetes Mellitus
influence of insulin on blood sugar and calcium curves of child, 103
tolerance test in diabetes, *1005
Intelligence quotients; relation of declining intelligence quotients to maladjustments of school children, 1401
rating of allergic child, 1152
relation between bodily development, constitutional form, talent and character at school age, 182
relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
International Congress of Open Air Schools, third, 859
International Congress of Pediatrics, 354
Intestines: See also Colon; Duodenum; Gastro-Intestinal Tract; Rectum; Sigmoid
abnormalities; malrotation of intestines in child aged 9 months; cured by operation, 900
abnormalities; megaduodenum, 1392
atresia, 1391
bacteria in; influence of dried fruits and absorbing agents on intestinal flora of white rats, 1391
bacteria injected directly into cecal end of colon; results, 144
Breslau enteritis, epidemiologic, bacteriologic and clinical peculiarities of hospital epidemic of, 378
cancer in childhood, 182
diphtheria of, 373
disorders treated with apple powder; simplification and improvement on Heisler-Moro raw apple diet, 1391
diverticula; perforated peptic ulcer in Meckel's diverticulum, 1142
diverticula; roentgen picture of Meckel's diverticulum, 409
enterocolitis caused by Ascaris and Trichocephalus, 147
exomphalos associated with volvulus neonatorum; result 6½ years after operation, 1392
ileitis, distal or regional, ulcerative enteritis; not an entity, 144
inflammation; treatment of acute enterocolitis, 147
intra-abdominal torsion of appendices epiploicae; report of 2 cases; review of literature, 402
motility, effect of acetic acid on, 1394
motility; effect of vitamin D on intestinal atony of rickets, 1087
obliteration; congenital obliteration of small intestine, 1147
Obstruction: See also Intussusception; etc.
obstruction, acute, following hernia into ascending mesocolon, 1171
obstruction in infant due to unusual cause, 166
obstruction; peculiar case of ileus in newborn, 410
Intestines—Continued
obstruction resulting from hemorrhage in new-born; report of case with necropsy, *1052
Parasites: See also Ascariasis; Dysentery; Hookworm Infestation; Myiasis
parasites; helminthiasis in children, 877
parasites; incidence of helminthic parasites; epidemiology of F. Buskii in China, 1121
parasites; infestation of Egyptian infants and children, 1121
parasites; investigation of incidence of intestinal worms, particularly Trichuris trichiura, in patients of Copenhagen University children's clinic, 379
parasites; standardization of iodine stain for wet preparations of intestinal protozoa, 850
parasites; therapy of oxyuriasis, 1276
stenosis; roentgen diagnosis of congenital anatomic and functional stenosis of large intestine, 901
Intoxication: See Alcoholism; Toxemia; etc.
Intravenous Injections: See Injections, intravenous
Intussusception, acute, 404
concurrent, chronic and retrograde, 405
jejunal, 1390
Iob, L. V.: Body content of certain minerals during fetal life; mineral storage, 686
Mineral composition of bone and cartilage of human fetus, *1025
Iodine contents of water, milk and pasture and occurrence of endemic goiter in 2 districts of England, 428
fatal iododerma; eleventh case reported in literature, 659
in Blood: See Blood, iodine
intake and endemic and experimental goiter, 427
metabolism; importance in young organism; relation between iodine of blood and vitamins, 594
metabolism; importance of iodine in child; content of iodine in blood of healthy child between birth and 9 years of age, 359
metabolism; importance of iodine in childhood; iodine content of cerebrospinal fluid in children from birth to 9 years, 414
metabolism; importance of iodine in young organism; relation between iodine of blood and glands of internal secretion, 429
Iris; bilateral pupillary anomalies; persistence of annular sinus, 931
changes caused by syphilis, with congenital ectopia lentis, 171
congenital pigmented cysts of iris and ciliary zone; vestige of vascular membrane of lens; persistence of hyaloid artery, 170
multiple pigmented congenital cysts of, 934
Iron metabolism of normal young women during consecutive menstrual cycles, 1083
reduction, intestinal, effect of vitamin D on, 1087
retention; effect of vitamin B intake on iron retention in normal infant, 683
retention in infancy, 1347
Therapy: See also under Anemia; etc.
therapy; action of iron, 100
utilization of organic and inorganic iron by normal infant, *252
Irradiated Milk: See Milk, irradiated
Italians; biometric data and morphologic median of Cantanese new-born, 864

Jackson, C. L.: Chronic stridor in infancy, 1426
Jackson, S. H.: Comparative value of spinach and tomatoes in child's diet, 684, 946
Jacobsen, A. W.: Hereditary osteochondrodystrophia deformans, 944
Jaffé, R. H.: Macroglossia in children; review of literature; report of case of true muscular hypertrophy; classification, *1328
Jaundice and anemia with recovery in successive new-born siblings, 863
and basal metabolism in children, 359
and splenomegaly, 612
catarrhal, thrombopenic purpura associated with; report of case, 1130
congenital icterus gravis, 605

Jaundice—Continued
due to biliary cirrhosis with cyanosis and finger-clubbing, 900
epidemic, catarrhal; epidemiology, 877
epidemic, catarrhal, in school children, 1366
hemolytic, constitutional, 1134
icterus catarrhalis, severe pains in, 633
icterus neonatorum, cause of, 368
icterus of new-born, 1100
in cirrhosis; cholecystogastrostomy, 1392
kernicterus (Orth-Schmorl) with and without erythroblastosis in new-born, 367
spirochetal; chronic meningitis in Weil's disease, 1118
spirochetal; meningitis as complication of Weil's disease, **124**
spirochetal; meningitis in course of Weil's disease caused by L. canicula, 1121
Jaws, familial multilocular cystic disease of, 945
growth, aspects of, 939
Jeans, P. C.: Vitamin D requirement of child, 189
Jejunum: See Intestines; Intussusception
Jennings, K. G.: Paroxysmal atrioventricular nodal tachycardia in new-born, *557
Johnston, J. A.: Caloric and protein requirements and basal metabolism of children from 4 to 14 years old, *29
Effect of thyroid on nitrogen balance in period of growth, 1191
Joints: See also under names of individual joints
abnormalities and dermatorrhexis; report of case, 956
ankylosis; amyoplasia congenita associated with mongolism, 433
Diseases: See Arthritis; etc.
Jones, W. A.: Familial multilocular cystic disease of jaws, 945
Josephs, H. W.: Unusual case of hemolytic anemia, 187
Jung, R.: Infection of lower part of genital tract in girls, *459
Jurisprudence, medicine and juvenile delinquency, 1401

Kala-Azar: See Leishmaniasis
Kantrow, A. H.: Blood sugar in diabetes in children, *1005
Kapnick, I.: Coagulation of blood in anaphylactic and other types of shock, 444
Kato, K.: Iron-cobalt treatment of physiologic and nutritional anemia in infants, 186
Sternal marrow puncture in infants and in children, *209
Keith, H. M.: Unusual case of carbuncle of brain with recovery, 960
Keller, H. M.: Bacteriologic studies of epidemic of pleurodynia, *231
Kennedy, R. L. J.: Hypertrophic pulmonary osteo-arthropathy in infants and children, *795
Keratitis, experimental, syphilitic, in rabbit, 881
interstitial; herpes zoster ophthalmicus preceded by ocular symptoms, 931
punctata superficialis and swimming pool conjunctivitis in Chinese, 658
Trachomatous: See Trachoma
Keratoderma: See Keratosis
Keratomalacia: See Cornea, softening
Keratosis; erythrokeratoderma variabilis in 1 family, 1170
Kereszturi, C.: Fate of children infected with tuberculosis during first 5 years of life, *15
Kernicterus: See under Jaundice
Ketone Bodies: See under Blood; Urine
Ketosis: See Acidosis
Kidneys: See also Urinary Tract
abnormalities in unfamiliar rachitic syndrome, 1186
abscesses of cortex of right kidney; decapsulation followed by recovery, 159
Amyloid Degeneration: See Amyloidosis
calcification and infantilism with bony changes resembling rickets, 1162
calculi and ionized blood calcium, 647
Kidneys—Continued
calculi; occurrence of citric acid in renal calculi of rats, 1405
changes due to mineral metabolism; calcium and the kidney; experimental study, 1083
Diseases: See also under Nephritis; Pyelitis; Pyonephrosis
diseases and changes in shape and size of heart, 1156
diseases and mineral metabolism; calcium and kidneys, 591
diseases; lipoid nephrosis and azotemia, 159
diseases; pure lipoid nephrosis in girl 2 years old, 159
function tests in childhood, 158
function tests; urea clearance test of Van Slyke in children, 649
hydatid cyst of kidney in child 10 years old, 160
hypernephroid tumors of, 158
infarction, bilateral, in new-born; report of case, 111
infection of renal parenchyma from pelvis of kidney, *1
insufficiency; effect of complete renal insufficiency on action of parathyroid hormone in dog, 420
solitary, congenital, 161
sporotrichosis of; report of case 918
tuberculosis in childhood and adolescence, 156
tumors, hypernephroid, 158
unilateral, congenital, 160
unilateral; curve of phenolsulfonphthalein elimination in disease of unilateral kidney, 1404
ureteropelvic obstruction in young, 646
Klippel-Feil Syndrome: See Spine, abnormalities
Knees, rare deformity of, 168
subacute and chronic nontuberculous diseases of knee joint in childhood, 1163
Koch's Bacillus: See Tubercle Bacilli
Korsakoff syndrome in case of tuberculosis, 414
Krause Glands: See Conjunctiva, cysts
Kwashiorkor, 104
Kyphosis: See Spine, curvature

Labor; cevitamic acid content of blood serum of women in labor, 1353
Complications: See Cesarean Section; Fetus; New-Born Infants; etc.
Labyrinth: See Ear, internal
Lactation: See also Infant Feeding; Milk
effect of prolactin on secretion of breast milk, 950
effect of protein on mammary secretion, 595
in adrenalectomized rats, 99
production of mammary secretion in male guinea-pigs by anterior pituitary extract, 924
stimulation of mammary secretion in dogs by anterior pituitary extract, 924
Lactose; effect of betalactose and fat on flora of infant's stool, 590
Lambliasis and abdominal pain in children; gastric syndromes, 406
Langner, P. H.: Immunization against human influenza, 678
Larynx, Diphtheria: See under Diphtheria
ectopic benign growths of thymus and thyroid tissue in, 1385
in relation to chronic stridor in infancy, 1426
inflammation, severe, occurring late in measles, 1109
laryngeal symptoms in children, 1137
myiasis of, 393
Lateral Sinus Thrombosis: See Thrombosis, Sinus
Laurence-Biedl Syndrome; case of acrocephalosyndactylism in new-born, 1356
case report, 1406
familial form of retinitis pigmentosa with blindness and obesity of cerebral origin; first anatomic observation, 657
girdle type of adiposity among mentally deficient males, 1257
Laurence-Moon-Biedl syndrome, *334
neuro-endocrine aplasia and polydactylism of, 162
resembled by new syndrome (Biemond), 924

Lead meningitis, cholesterol content of organs in, 1400
poisoning in children; prevention, 1417
poisoning; influence of exposure to sunlight and vitamin D on lead poisoning in rats, 1184
poisoning; ratio of large to small lymphocytes in persons exposed to lead hazard, 181
Left and right-handedness and emotional factors in mental retardation; reading problem, 642
Legg's Disease: See Osteochondritis deformans juvenilis
Legumes, powdered, added to infants' food, 1085
Leiner's Disease: See Erythroderma desquamativa
Leishmaniasis; fever at onset of kala-azar, 123
kala-azar cured with urea stibamine, 878
technic of spleen puncture in, 887
Lemmoblastosis, diffuse, of central nervous system, 910
Lens: See also Cataract
congenital ectopia lentis and changes in iris caused by syphilis, 171
congenital pigmented cysts of iris and ciliary zone; vestige of vascular membrane of lens; persistence of hyaloid artery, 170
growth in mass and volume of human lens in postnatal life, 1164
hereditary luxation of, and syndrome of Marfan, 170
pigmented deposits in lens of doubtful nature, 169
Lenticular nucleus, degeneration; status pigmentatus; pathology; relation to Hallervorden-Spatz disease, 412
Leptospira: See Jaundice, spirochetal
Lesem, A. M.: Failure of abundant sunshine to protect against rickets, *1227
Leukemia, diagnosis in childhood, 1131
juvenile, acute, of lymphadenic and osseous type, 137
lymphatic; febrile anemia of obscure origin, 888
myelogenous, acute; diagnosis by sternal marrow puncture, *209
myelogenous erythroleukaemia infantum, 619
myelogenous, in infancy, 132
Leukocytes: See also under Blood; Leukemia; Lymphocytes; etc.
cytoplasmic and nuclear changes in neutrophils in severe infectious states, 389
effect of cevitamic acid on proliferation of monocytes, 1380
experimental researches on reciprocal action of diphtheria bacilli and human leukocytes in presence or absence of antitoxin, 1109
pathologic granules in leukocytes in children, 888
response of leukopoietic system to toxins of whooping cough bacillus, 1360
Leukopenia: See Angina, agranulocytic; Leukocytes
Leukorrhea, physiologic; genesis in new-born, 367
Levine, S. Z.: Respiratory metabolism in infancy and childhood; nitrogen metabolism in premature infants; comparative studies of human milk and cow's milk, *1030
Levitsky, J.: Comparison of oral, axillary and rectal temperatures; clinical study, 1424
Levulose in Urine: See Urine, levulose
Lichty, J. A., Jr.: Subacute bacterial endocarditis due to hemolytic para-influenza bacillus, *1311
Light, failure of abundant sunshine to protect against rickets, 1227
influence of exposure to sunlight and vitamin D on lead poisoning in rats, 1184
origin of vitamin D and relation to solar radiation, 1183
photo-activity of foods irradiated by sun, 856
Therapy: See Heliotherapy; and under names of diseases
Lilienthal, J. L., Jr.: Unfamiliar rachitic syndrome, 1186
Limbs: See Arms; Extremities
Lindau's Disease: See Angioma
Lindsay, L. M.: Acute salicylate poisoning, 952
Lipids: See under Blood; Lipoids
Lipoidosis: See Anemia, splenic; Idiocy, amaurotic; Niemann's Disease; Schüller-Christian Syndrome; Xanthoma
Lipoids: See also Cholesterol; Fat; Phosphorus metabolism; altered lipid metabolism in infections of children, 1182
Pneumonia: See Pneumonia
Lipoma of thumb and index finger resembling elephantiasis, 438
Lipomatosis: See Lipoma
Lippard, V. W.: Human passive transfer antibody; neutralization of antigen, *777
Human passive transfer antibody; titration by neutralization, *288
Passive transfer antibody; fluctuations of titer in treated and untreated hay fever, 1181
Lips, diphtheria of, 875
Harelip: See Harelip
Lithiasis: See Bladder, calculi; Kidneys, calculi
Lithopedion, report of case of, 603, 1096
Liver, abscess, large, primary, due to Staph. aureus, 146
acute yellow atrophy of liver caused by typhoid; fatty degeneration caused by excess of cholesterol esters; report of case, 378
cirrhosis due to congenital atresia of bile duct, 409
cirrhosis, (?) idiopathic; hepatosplenomegaly, 900
cirrhosis in Northern Circars, India; toxic cirrhosis, 1392
cirrhosis with jaundice; cholecystogastrostomy, 1392
disease; Millon's test in hepatic disease, 1394
disease, rachitis hepatica, 408
dystrophy of, 948
effect of hyperthermia on distribution of water and electrolyte in liver, 183
Extract: See also under Anemia; Liver, necrosis; etc.
extract; chemical nature of antianemic principle, 132
extract, peculiar allergy to, 665
failure, alteration in serum proteins as index of, 630
function and the blood ketone curves of children, 102
Glycogen: See Liver, physiology
hepatomegaly with retardation of statural growth in diabetic child, 1143
hepatopathy, latent (anicteric), diffuse, 1146
hepatosplenomegaly in gargoylism, 601
hydatid cyst of; 2 cases in children, 1 with rupture, 145
Hypertrophy: See also Liver, cirrhosis; Niemann's Disease
hypertrophy; hepatomegaly with disturbance of carbohydrate metabolism, 901
hypertrophy; hepatosplenomegaly; (?) idiopathic cirrhosis, 900
hypertrophy; type E multiple anomalies of skeleton, with enlargement of liver and spleen and mental retardation, 364
infectious hepatitis, infantile, 402
infiltration; massive fatty infiltration in child, 1144
insufficiency in childhood; treatment at Pougues-les-Eaux, 147
necrosis; liver preparation protecting against necrosis from chloroform or carbon tetrachloride, 670
Oils: See Cod Liver Oil; Oil
pathology; acquired resistance of fixed tissue cells to chemical injury, 591
physiology; relation to respiratory quotient during fasting, 1188
rupture; etiology in new-born, 864
tuberculosis; hemiplegic forms of Hutinel's disease, 631
tumor, diagnosis of, 1146
Lobectomy: See under Bronchiectasis
Lowenburg, H., Sr.: Scurvy with unusual symptom, *73, 1420

Lues: See Syphilis
Lungs: See also Pleura: Respiration; Respiratory Tract; Thorax; etc.
abscess, 142, 1139
abscess and hypertrophic pulmonary osteo-arthropathy, *795
abscess; diagnosis in older child, 629
abscess, experimental, 397
Actinomycosis: See Actinomycosis, pulmonary
agenesis of; review of literature; report of case, 1138
cancer, primary, in 11 year old child, 628
cancer, primary, in girl 5 years old, 143
cancer, primary, in 2 children, 143
Collapse: See also Pneumothorax
collapse; atelectasis of upper lobe of lung in children, 1389
collapse; congenital atelectasis due to fetal pneumonia, 626
collapse; dextropositio cordis in relation to atelectasis in new-born, 369
collapse of lower lobe of left lung, 627
collapse; prevention and treatment of atelectasis in new-born; use of new inclined receiving table, 605
cyst, congenital; report of case, 141
cystic, congenital malformation of lung; report of 2 cases, 895
defects; bronchographic diagnosis of congenital defects of lung, 897
Diseases: See also Tuberculosis, pulmonary; etc.
diseases; chemotherapy (sulfanilamide) in treatment of streptococcic infections of lung, 951
edema, acute, in new-born, reflexes as cause of, 627
edema, experimental, 1194
excision of a lung, 937
fluke disease of; clinical studies of endemic hemoptysis caused by P. Westermanii infestation, 1115
malaria with characteristic pulmonary syndrome in boy, 878
pulmonary hypertrophic osteo-arthropathy, 1409
roentgenograms of; interpretation of hilar shadows in roentgenograms of children, 398
roentgenography; marginal shadows proximal to pleura in roentgen picture, 1389
stenosis and tuberculosis, 613
suppuration, treatment with hypertonic salt solution, 629
Surgery: See under Bronchiectasis
Tuberculosis: See Tuberculosis, pulmonary
Vital Capacity: See Vital Capacity
Lupus erythematosus, acute; report of case, 666
Lymph Nodes: See also Lymphogranuloma; etc.
mesenteric lymphadenitis, diagnosis of, 165
tracheobronchial; roentgen treatment of enlarged inflammatory tracheobronchial lymph nodes, 1139
tuberculosis of mediastinal glands of young children, 127
tuberculous; bacteriology of tuberculous abdominal adenitis, 1372
tuberculous bronchial glands after childhood, 388
tuberculous; general prognostic aspects of tuberculous adenitis of abdomen, 1373
tuberculous; investigations on identical twins with respect to tuberculous adenitis, 109
tuberculous; pathogenesis of scrofula, 384
tuberculous; roentgenographic aspects of tuberculous adenitis of abdomen, 1372
tuberculous; surgical aspects of tuberculous adenitis of abdomen, 1373
Lymphangioma: See Angioma
Lymphatism: hypertrophy of thymus and sudden death in infant 4 months old, 164
Lymphoblastoma; primary cancer of lung in 2 children, 143
Lymphocytes: See also Leukemia; Leukocytes
ratio of large to small lymphocytes in persons exposed to lead hazard, 181
Lymphogranuloma, case of Hodgkin's disease, 167
Lymphosarcoma: See under Sarcoma
Lyon, G. M.: Influence of air conditions on incidence of bacillary dysentery, 673

Mc Clure and Aldrich Test: See under Edema
McCrackin, R. H.: Albinism and unialbinism in twin African Negroes, *786
McCune, D. J.: Osteodystrophia fibrosa, combined with precocious puberty, pathologic pigmentation of skin and hyperthyroidism; report of case; review of literature, *806
McGraw, M. B.: Moro reflex, *240
MacGregor, R. R.: Familial multilocular cystic disease of jaws, 945
McGuinness, A. C.: Effect of lyophil pooled adult serum administered by mouth on positive Dick test as compared with other methods of administration, 1177
Immunization against human influenza, 678
McIntosh, J. F.: Case of sclerema neonatorum, 959
McKhann, C. F.: Coagulation of blood in anaphylactic and other types of shock, 444
McKinlay, B.: Infectious diarrhea in newborn caused by unclassified species of Salmonella, *1252
Macrogenitosomia: See Adolescence, precocious puberty
Macroglossia: See Tongue
Macula lutea, familial macular degeneration of unknown cause, 932
Macy, I. G.: Relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
Stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants; basic study, *726
Malaria, avian; action of methylthionine chloride on, 1121
characteristic pulmonary syndrome in boy, 878
chronic or congenital, similarity to erythroblastic anemia; successful treatment of 8 patients with quinine, *60
congenital, 377, 1101
congenital, in Bahia, 609
in children, 376
Therapeutic: See also under Poliomyelitis
therapeutic; malaria treatment of nonsyphilitic nervous disorders in childhood, 155
therapy; effect of antimalaria drugs on malaria parasites, 124
Malformations: See Abnormalities and Deformities; Monsters; and under names of organs and regions
Mammary Gland: See Breast
Mantoux Test: See Tuberculin Reactions
Mapharsen: See under Syphilis
March Foot: See Foot
Marfan Syndrome: See Fingers and Toes, abnormalities
Marie-Bamberger Disease: See Osteo-Arthropathy, hypertrophic, pulmonary
Maroney, J. W.: Caloric and protein requirements and basal metabolism of children from 4 to 14 years old, *29
Effect of thyroid on nitrogen balance in period of growth, 1191
Marples, E.: Respiratory metabolism in infancy and childhood; nitrogen metabolism in premature infants; comparative studies of human milk and cow's milk, *1030
Marriage, consanguinity and heredity in ophthalmology, 437
health law and congenital body deformities, 861
Mastoidectomy; streptococcic meningitis with recovery after mastoidectomy, 1420
Mastoiditis duplex and cryptogenic fever, 396
importance in infancy, 892
mastoid infection in children, 1137
surgical, acute, prevention of, 1137
Maternity; neglected mothers, 859
welfare; protection of children by department of Seine; role of visiting nurse, 602
Mathematics; congenital arithmetic disability and acalculia (Henschen), 915

Measles complicated by acute appendicitis, 869
complicated by encephalitis, 1111, 1362
complicated by neurotropic infections in children, 606
complicated by subcutaneous emphysema, 606
complicated by tuberculosis, 873
complications, cerebral, in 2 cases, 373
complications; severe laryngitis occurring late in measles, 1109
encephalomyelitis during and after measles, 1110
followed by cancrum oris, 1107
followed by encephalomyelitis, 637
followed by ethmoidal suppuration with orbital involvement, 396
German: See Rubella
histology of conjunctival mucosa in measles during incubation period, 872
immunity; convalescent serum in prevention and modification of measles, *277
immunity; method of determining dosage of placental globulin in measles prophylaxis, 1345
immunity; peculiar and hitherto unreported phenomenon observed in children immunized against measles by injections of normal blood, 873
immunity; potency of globulin fraction prepared by methyl alcohol precipitation, 591
in children, 120
prevention and attenuation by use of human placental extracts, 1111
prevention and modification with placental extract (immune globulin, human), 1103
prevention and placental extract, 1103, 1112
treatment, 1112
treatment with vitamins A and D, 117
Meckel's Diverticulum: See Intestines, diverticula
Mediastinum, Lymph Nodes: See Lymph Nodes
lymphosarcoma of, 1141
teratoma in child 7 months old, *1057
Medicine, Legal: See Jurisprudence
Medin-Heine Disease: See Poliomyelitis
Megacolon: See Colon, dilatation
Meinicke Reaction: See also under Syphilis; Tuberculosis
Meinicke clarification reaction of spinal fluid, 128
Melena; idiopathic melaena neonatorum, 865
Menarche: See Menstruation, inception
Meninges, hemorrhage; paralysis associated with hemophilia, 889
hemorrhage; rôle of scurvy in etiology of chronic subdural hematoma, 852
melanoblastosis of; extensive pigmented nevus associated with primary melanoblastosis of leptomeninges of brain and spinal cord, 902
mixed infection of meninges with Koch's bacillus and Friedländer's pneumobacillus, 1151
Meningitis, 154: See also Meningococci; Meningo-Encephalitis; Pachymeningitis
brucella; successful treatment with immune human serum; isolation of organism by modified cultural method, 876
cerebrospinal, ocular complications of, 868
chronic, in Weil's disease, 1118
complicated by mumps, 872
complicating Weil's disease, 124
complicating Weil's disease caused by L. canicula, 1121
due to organisms belonging to Salmonella group, 1396
in infancy, 1398
in new-born, 150
influenzal, 1396
influenzal, of 7 months' duration, 641
lead; cholesterol content of organs in lead meningitis, 1400
meningococcic, labyrinthitis secondary to, 868
meningococcic; treatment of patient with meningococcus antitoxin (Ferry); recovery, 870
meningococcic; treatment with sulfanilamide, 676
meningococcic, with ocular complications, 872
mixed meningococcic and streptococcic meningitis, 1397
Meningitis—Continued
otitic; treatment with continuous spinal drainage; report of case, 393
pneumococcic; report of case with recovery, 636
purulent, in Leipzig children's clinic, 639
staphylococcic, reducing substance present in ventricular and spinal fluid of child with, 415
streptococcic, 1397
streptococcic, with recovery, 1149
streptococcic, with recovery after mastoidectomy and intraspinal use of lyophil convalescent scarlet fever serum, 1420
subacute, due to hereditary syphilis; report of case, 128
syphilitic, subacute, congenital, resembling tuberculous meningitis, 884
treatment with meningococcus antitoxin, 1362
treatment with p-aminobenzenesulfonamide in meningococcic infection of mice, 1397
tuberculous, 386, 1375
tuberculous, pathogenesis of, 129
tuberculous, rôle of bovine bacillus in etiology of, 1124
tuberculous, simulated by subacute congenital syphilitic meningitis, 884
tularemic; report of case; postmortem observations, 1365
Meningocele: See Spina Bifida
Meningococci: See also under Meningitis
antiserums in human and mouse meningococcic infections, 1175
endotoxin of, 1107
experimental infection in mouse, 116
immunologic relations of type-specific polysaccharide from type I meningococci, 1175
septicemia, chronic, 118
suppurative arthritis of cryptogenic origin, 123
Meningo-Encephalitis: See also Encephalitis; Meningitis
acute, postinfectious, 1398
basilar, acute, dehydration and acidosis in case of, 152
diagnostic importance of infectious encephalomeningitis in relation to tuberculous meningitis and poliomyelitis, 415
Meningo-encephalomyelitis neonatorum; anatomic report of case, 634
Menorrhagia: See under Menstruation
Menstruation disturbances in young women, roentgen treatment of, 919
in girl 3 days old, 1100
inception; catamenia of 2,000 Chinese school girls, 920
iron metabolism of normal young women during consecutive menstrual cycles, 1083
menorrhagia occurring at onset of catamenia in patient with thrombopenic purpura, 134
relation of herpes antiviral property of human blood to, 355
Mental Diseases: See Feeblemindedness; Insanity; Mental Hygiene; Nervous and Mental Disabilities; Neuroses and Psychoneuroses; Psychiatry; etc.
Mental Hygiene; problem parent, 1401
psychiatrist's view of problem of prevention in pediatrics, 1402
Mercury; bactericidal and biologic properties of phenyl mercuric subnitrate, 355
Mesentery, cysts of, 631
Lymph Nodes: See Lymph Nodes
Metabolism: See also under specific headings, as Carbohydrates, metabolism; Minerals, metabolism; Nitrogen, metabolism; etc.
basal, and ovarian hormone of hyperthyroid rats, 420
basal, in young children, 1086
energy of normal persons; comparison of estimation of basal metabolism from linear formula and "surface area," 851
energy of normal persons; standard for basal metabolism, with nomogram for clinical application, 851
in children, 359
in children from 4 to 14 years old, *29
significance of respiratory quotient during fasting, 1188

Methylthionine Chloride: See under Malaria, avian
Mexican, foods; vitamins B and G and pellagra and other manifestations due to lack of these vitamins, 856
twins, albinism in, *792
Microcephaly and congenital malformation of cerebrum, 634
microcephalic fetus without eyes and nose and with serious defects of forebrain, cerebellum, inner ear and endocrine glands, 861
Microphthalmos: See under Eyes
Micturition: See Urination
Milk: See also Infant Feeding
acid and acidified, 1348
acidified; clinical observations on feeding infants acidified milk, 1082
allergy, manifestations of, 592
causing numerous cases of diarrhea in infants, 407
certified, for infant feeding, 99
cevitamic acid and glutathione in cow's milk in Manchuria and Mongolia, 359
clotting mechanism; rôle of milk components in coagulation, 1346
colloid science in infant nutrition, 854
cow's compared with human milk, *1030
curd, mechanism and modification of, 1084
gelatinized; clinical observations on feeding infants gelatinized milk, 1082
Human: See also Lactation
human; blood sugar in breast milk intoxication, 1093
human; carotene and vitamin A contents of mother's milk in Batavia, 592
human, compared with cow's milk, *1030
human, daily variations in fat content of, 595
human, frozen; daily availability from Children's Welfare Federation, 356
human, lactoflavin and vitamin B_2 in; quantitative estimation, 597
human; lactose content at various times during nursing, 595
human; protein content of mother's milk obtained at various times during nursing period, 358
human; protein fractions (casein and soluble albumins) in mother's milk during course of nursing; influence of fat on precipitation of casein, 594
human; vitamin C content of breast milk, seasonal variations in, 1352
human; vitamin C content of mother's milk as affected by change of climate, 1092
human; vitamin C content of mother's milk in Batavia, 593
irradiated, antirachitic efficiency of vitamin D in, 360
lactic acid milk (powdered) in infant feeding, 358
lactoflavin and vitamin B_2 in; quantitative estimation, 597
metabolized (yeast), antirachitic efficiency of, 360
milk-borne diseases, 1347
milk-borne epidemic of scarlet fever, 117, 1360
milk-borne epidemic of scarlet fever and sore throat, 369
milk-borne epidemic of septic sore throat, prompt report of, 138
milk-borne epidemic of staphylococcic food poisoning, 403
milk-borne epidemics, age incidence and sex incidence of, 123
modification and infant constitution, 852
raw and sterilized milk; influence on growth and reproduction in rats, 106
sensitivity of infants with eczema, 448
tetanogenic effect of cow's milk on infants, 1225
vitamin C content of cow's milk and milk mixtures, 1092
vitamin D; prophylactic value of vitamin D irradiated and vitamin D yeast-fed milk, 855
Miller, J. J., Jr.: Opsonocytophagic test in cases of pertussis and in cases of children vaccinated with antigens of H. pertussis, 1179
Millon Reactions: See Urine, phenols
Minerals: See also Iron; etc.
metabolism; calcium and the kidney; experimental study, 1083
storage, body content of certain minerals during fetal life, 688
Minot, A. S.: Factors influencing disposition of fluids given intravenously, 185
Mitchell, A. G.: Acidosis and alkalosis in children, 183
Relation of endocrine disturbances to certain heredodegenerative symptoms, 194
Möbius' Disease: See Paralysis, cranial
Mongolism, amyoplasia congenita associated with, 433
anatomic and pathologic features of mongoloidism, 640
emendation of organic aspects of pathologic speech of mongolians, 1401
in American Indians; 3 cases, 1152
in 1 of dizygotic twins; report of case, 156
mongolian idiocy in twins, 156
multiple incidence in same family, 912
Monocytes: See Leukocytes; etc.
Mononucleosis, infectious; 3 cases of infectious lymphomonocytic adenopathy, 1369
Monoplegia: See under Paralysis
Monsters, sympodia in, 603
Moon-Laurence-Biedl Syndrome: See Laurence-Biedl Syndrome
Moore, C. U.: Failure of abundant sunshine to protect against rickets, *1227
Morbidity: See Vital Statistics
Morgan, E. A.: Value of mapharsen in treatment of congenital syphilis, 957
Morgan, J. O.: Congenital stenosis of entire colon, *1320
Moro Reflex: See Reflex, grasping
Moro-Heisler Diet: See Apples
Morquio's Disease: See Bones, atrophy
Morse, M.: Utilization of organic and inorganic iron by normal infant, *252
Mortality Statistics: See Infant Mortality; New-Born Infants, mortality
Mothers, Unmarried: See Maternity
Mouth; Arthus phenomenon in oropharyngeal mucosa, 97
Inflammation: See Stomatitis
Mucin: See Stomach, secretion
Mumps: See Parotitis
Muscles, abnormalities; amyoplasia congenita associated with mongolism, 433
Atrophy: See Atrophy, muscular
Dystrophy: See Dystrophy, muscular
hypertrophy; congenital muscular hypertrophy of upper extremity, 168
hypertrophy; macroglossia in children; review of literature; report of case, 1328
myopathy, 433
myopathy, primary; report of 36 cases; review of literature, 654
Ossification: See Myositis ossificans
pectoral, congenital absence of, 1356
pectoral, congenital defect of, 860
physiology; test of Donaggio and muscular activity in child, 1162
Tonus: See Dystonia; Myotonia; Rigidity; and under names of muscles
water and electrolyte distribution in, effect of hyperthermia on, 183
Mutism: See also Deaf-mutism
thymogenic, in early childhood; treatment, 645
Myalgia, Epidemic: See under Myositis, epidemic
Myasthenia, experiments with quinine and prostigmin in treatment of, 1161
gravis, bacteriologic studies of, 165
gravis, serologic studies with streptococci isolated in cases of, 165
gravis, thymoma and thymic hyperplasia in, 162
Myelitis: See Encephalomyelitis
Myeloma, multiple; systemic disease of myeloid tissue in children, 1411
Myiasis of larynx, 393
screw worm infestation, 376
Myocarditis, severe, of unknown etiology, 390
Myopathy: See under Muscles

Myopia; relation between general state of health and incidence of myopia in school children, 934
Myositis, epidemic; bacteriologic studies of epidemic of pleurodynia, *231
epidemic; minor outbreak of epidemic myalgia in Paris, 123
epidemic myalgia in childhood, 378
epidemic pleurodynia, 1368
epidemic pleurodynia in Chariton County, Mo., 1366
ossificans multiplex progressiva, roentgen treatment of, 928
Myotonia congenita of Werdnig-Hoffmann type, 167
experiments with quinine and prostigmin in treatment of, 1161
Myxedema: See also Thyroid, hypothyroidism
following removal of aberrant thyroid tumor, 425
infantile, 428
observations through infancy, childhood and early adult life, 423
psychiatric aspects of, 651
serum lipase content in, 164
with hypochromic anemia and hypercholesteremia in child, 428

Nails; onychorrhexis with recovery; report of case, 936
Nasopharynx, residual lymphoid tissue in; frequency and effect on eustachian tube, 392
Neck, extensive plexiform neuroma of, 1396
Fistula: See Fistula, cervical
pneumatocele of, 627
pterygium colli in field of multiple anomalies, 1097
Necrosis adiposa neonatorum, 368
Negroes; albinism and unialbinism in twin African Negroes, *786
dental caries in; effect of diet on caries in South African Bantu, 179
hemophilia in, 614
ossification of carpal centers in children in Cape Town, South Africa, 590
racial incidence of poliomyelitis in United States, 116
Neisseria: See Gonococci; Meningococci
Nelson, W. E.: Possibility of sensitization to tuberculin, 446
Nematodes: See Ascariasis; Hookworm Infestation; Oxyuriasis; etc.
Neoplasms: See Cancer; Sarcoma; Tumors; etc.
Nephritis: See also Albuminuria; Hematuria; Pyelonephritis; and under Kidneys
acute, complement titer in, 647
chronic, associated with arterial hypertension and azotemia in girl aged 15 years, 160
effect of dietary protein on urea clearance of children with nephrosis, 916
familial disposition to nephritis in scarlet fever, 1111
glomerular, 1403
glomerulonephritis; final outcome in children, 1156
hemorrhagic, acute; humoral syndrome during long course of nephritis in girl 9 years old, 918
hyperparathyroidism in renal disease, 1154
lipoid nephrosis; case report, 1156
nephrosis, pathogenesis of, 1156
nephrosis, treatment of, 417
postscarlatinal, prevention of, 608
Nephrosis: See Kidneys, diseases; Nephritis
Nerves, auditory, bilateral tumor of, as component of generalized neurofibromatosis, 155
cranial; congenital disturbances of cranial motor nerves in 11 members of 1 family, 1149
optic, etiology of familial diseases of, 436
optic; inheritance of opaque nerve fibers in retina (papilla leporina), 435
optic; pseudo-atrophy in young infants, 1166
optic, tumor of; neuroperinervosa gliomatosa, 658
Paralysis: See under Paralysis
peripheral, cevitamic acid content of, 1352
Nerves—Continued
presacral; sympathetic innervation of external sphincter of human bladder, *1012
radial paralysis due to fracture of humerus in new-born, 367
vagus, operation on, followed by pulmonary edema, 1194
Nervous and Mental Disabilities: See also Chorea; Encephalitis; Feeblemindedness; Idiocy; etc.
"accidental" self-injury in children, 913
children's hospital for neurologic and behavior disorders, 642
do problem children become delinquents and criminals? 1401
emotional factors in mental retardation; reading problem, 642
need for and aims of psychologic inspection, 916
neuropsychic disorders of childhood, etiologic considerations of, 645
prevention of; possibilities and limitations, 1402
spontaneous hypoglycemia with peculiar psychic disturbances, 1349
Nervous System: See also Brain; Nerves; Reflex; Spinal Cord; etc.
abnormalities; arachnodactyly and status dysraphicus; review, 1095
and absorption of poliomyelitis virus by cholesterol, 1272
cevitamic acid content of various parts of central nervous system and of peripheral nerves, 1352
Diseases: See Epilepsy; Neuroses and Psychoneuroses; etc.
injuries of central nervous system sustained at birth, 113
lemmoblastosis, diffuse, of central nervous system, 910
Syphilis: See Neurosyphilis
tumors; multiple hereditary hemangioblastomas, 634
Neuritis, multiple, from diphtheria toxoid; report of case, 1104
multiple; pseudomyopathic polyneuritis, 906
myeloradicular, after ingestion of atabrine (derivative of acridine), 1398
Neuroblastoma, adrenal, in 2 children, 1406
of adrenal medulla, 958
Neurocytoma of adrenal gland, with secondary growths causing blindness, 957
Neurodermatitis, disseminated: atopic dermatitis of young adults; precipitating factors in 101 cases; report of 10 cases with associated juvenile cataract, 661
Neurofibromatosis compared with von Hippel's disease; Lindau's disease, 932
diffuse lemmoblastosis of central nervous system, 910
familial congenital Bourneville's disease (tuberous sclerosis) associated with symptoms of neurofibromatosis (Recklinghausen's disease), 906
generalized, bilateral tumor of auditory nerve as component of, 155
of Recklinghausen, 936, 1414
Neuroma; extensive plexiform neuroma of neck, 1396
Neurons, diseases; polyneuritis; clinical and pathologic study of cases frequently referred to as instances of neuronitis, 149
Neuroses and Psychoneuroses; functional psychoses in children, 912
reactive psychosis in response to mental disease in family, 642
Neurosyphilis, juvenile, paretic, psychology of, 882
paretic, juvenile; physical complications, stigmas and endocrinopathies, 125
paretic, juvenile; treatment, 125
Neutropenia: See Angina, agranulocytic
Neutrophils: See Leukocytes
Nevi, angiomatous; Jackson's epilepsy in infant with nevi on face, 642
extensive pigmented nevus associated with primary melanoblastosis of leptomeninges of brain and spinal cord, 902
pigmented nevus of neck complicated by extensive plexiform neuroma, 1396

Nevoxantho-Endothelioma: See Xanthoma
New-Born Infants: See also under names of diseases, as Asphyxia neonatorum; Conjunctivitis; Cyanosis; Gangrene; Impetigo; Jaundice; Meningitis; Necrosis; Pneumothorax; Syphilis; Tetany; etc.
anemia in, 865
anthropologic study of skull of, 1359
apnea paroxysms with cyanosis in new-born with intracranial hemorrhage, 1358
aspiration of amniotic fluid; importance as cause of death, 368
aspiration of foreign body in, 141
atelectasis in, prevention and treatment of; use of new inclined receiving table, 605
biometric data and morphologic median of Cantanese new-born, 864
birth injuries, 366
birth injuries; fractures in new-born, 862
birth injuries, intracranial, 1100
birth injuries of central nervous system, 113
birth injuries; prevention, diagnosis, treatment and prognosis, 112
birth injuries, prevention of, 604
birth injury causing extradural hemorrhage, 110
birth injury; dislocation of lower end of nasal septal cartilage; replacement by orthopedic procedures, 621
birth injury; fracture of upper part of arm, management of, 1358
birth injury; paralysis of radial nerve due to fracture of humerus, 367
birth injury; spontaneous restoration of normal shape of femur after healing of fracture in position of flexion; case in newborn, 113
blood destruction high in, 114
blood in osteomyelitis of superior maxilla in new-born, 954
blood pictures of premature and full term infants during first months of life, 621
calcium and phosphorus content of cord blood in, 1359
carcinoma of tongue in, 603
cesarean section with intracranial hemorrhage, 1101
conjunctivopalpebral tumor (dermolipoma) of exceptional development in, 1358
cranial depression in, 112
death after ingestion of BCG, 884
delivery and care of infant of diabetic mother, 365
dermatitis, acute, in, 864
development of; at which degree of development may new-born human being be certified as a child? 865
diarrhea in; outbreak of diarrhea due to B. coli-mutabile, 862
edema due to prelacteal feeding; report of 4 cases, 1098
endocrine systems of new-born, pathologic anatomy of; fetal endocrinology, 653
erythroblastosis and congenital edema in, 1358
erythrophagocytosis in anemia of; 2 case reports, 1191
gonococcic arthritis in mother and infant, 366
heart rate in; paroxysmal atrioventricular nodal tachycardia in new-born, *557
hemoglobin metabolism in normal new-born, 864
hemorrhage in, causing intestinal and biliary obstruction; report of case with necropsy, *1052
hemorrhagic disease of, 1099
hydrating solution in infant feeding, 1083
hyperinsulinism in case of diabetes mellitus, 431
hypoglycemia of, and course of diabetes in mother, 1101
idiopathic melaena neonatorum, 865
ileus in, report of peculiar case, 410
infectious diarrhea caused by unclassified species of Salmonella, *1252
kernicterus (Orth-Schmorl) with and without erythroblastosis in new-born, 367
leukorrhea, physiologic, in new-born, genesis of, 367
loss of weight in new-born, prevention of, 110
New-Born Infants—Continued
malaria congenital in, 1101
meningitis in, 150
mineral composition of bone and cartilage of human fetus, *1025
Moro reflex in, *240
mortality in Dublin, 111
nasal obstruction in, 111
neoplastic extracranial tumor of, 603
nutritional anemia of; treatment, 135
O substance in new-born compared with that in adults, 113
osteomyelitis of superior maxilla in, 954
oxygen treatment of; face mask for use in administering oxygen, 1098
pneumoperitoneum spontaneous in new-born, 864
pneumothorax in, 863
pulmonary edema, acute, in new-born caused by reflexes, 627
renal infarction, bilateral, in new-born; report of case, 111
retinal fibrosis, massive, in children, 931
retinal hemorrhage in, 1099
rupture of liver in new-born, etiology of, 864
sclerema neonatorum, localized type of, 863
scoliosis of, 111
scurvy, latent in infants; content of cevitamic acid in blood serum at birth, 1353
scurvy, latent in new-born; capillary resistance, 1352
serious conditions encountered in, 365
sex ratio at birth, statistical study of, 599
sialadenitis of parotid gland, 1100
syphilitic lesions of cornea and conjunctiva in, 863
syphilitic pemphigus beginning on dorsal regions of hands and feet in new-born, 1129
taste and smell in, 864
thrombopenia, congenital, 1324
tuberculosis in, 369
vitamin C content of urine and feces of, 1101
Nicotine poisoning, acute; report of case in child, 1173
Niemann's disease; diagnosis by sternal marrow puncture, *209
relation between Tay-Sachs' and Niemann-Pick's disease; biochemical mechanism of processes, 620
Nitrite poisoning, 181
Nitrogen, metabolism; effect of thyroid on nitrogen balance in period of growth, 1191
metabolism in anemia during regeneration of blood, 881
metabolism, in premature infants, *1030
Nittis, S.: Similarity of erythroblastic anemia and chronic or congenital malaria; successful treatment of 8 patients with quinine, *60
Nodes: See under Rheumatic Fever; etc.
Nose: See also Nasopharynx; Otorhinolaryngology; Rhinitis; Smell; etc.
and throat in 500 cases of asthma, 895
deformities; etiology of congenital deformities of nasal septum, 623
deformity; congenital unilateral occlusion of posterior naris, 139
dislocation of lower end of nasal septal cartilage in new-born, infants and young children; replacement by orthopedic procedures, 621
obstruction in new-born, 111
rhinologic infections; use of benzedrine vapor in children, 1136
rhinorrhea and neoplasms of central nervous system, 635
"running" nose; clinical recollections and reflections, 623
Nurses; danger of tuberculous infection of nurses in sanatorium service, 387
visiting; rôle in protection of children by department of the Seine, 602
Nutrition: See also Diet and Dietetics; Dystrophy; Food; Infant Feeding; Metabolism; Vitamins; etc.
and food, 1084
caloric and protein requirements and basal metabolism of children from 4 to 14 years old, *29

Nutrition—Continued
clinical method of studying nutrition of school children, 593
disturbances; physiology of aneutrophia, 103
disturbances; treatment of hypotrophy, 358
effect of maternal diet on resistance to infection, 1178
feeding rural children, 1349
irreversible athrepsia, 103
malnutrition and C3 population, 1355
methods of evaluating nutritional state of children; report of Committee on Hygiene of League of Nations, 1348
modern outlook on, 102
of pupils in federal school of Rio de Janeiro, 1094
physical welfare of youth, 858
proper dietary as public health measure, 1094
relation of physical defects to nutritional impairment; examination of 30,000 children of 21 states, 599
wasting in infancy, 357

Obesity: See also Laurence-Biedl Syndrome; Pituitary Body, diseases
during growth, 1349
girdle type of adiposity among mentally deficient males, 1257
in childhood, 853, 1159

OBITUARIES:

Simmons, George H., 1202

Obstetric Injury: See under New-Born Infants
Obstetrics; position of obstetrician concerning question of perinatal infant mortality, 1100
Occipital bone; congenital absence of part of occiput due to congenital syphilis, 883
Oil: See also Cod Liver Oil; Fat; Olive Oil; etc.
fish liver; origin of vitamin D and relation to solar radiation, 1183
in lungs, new method of indentifying oil in lipoid cell pneumonia, 1195
lipoid pneumonia caused by oils, 625
Liver Oils: See also Cod Liver Oil; and under Rickets
liver oils; multiple nature of vitamin D of fish oils, 1350
Oldham, H.: Effect of vitamin B intake on retention of iron in normal infant, 683
Utilization of organic and inorganic iron by normal infant, *252
Olive oil, ozonides of; bactericidal and photochemical properties, 591
Ollier's Disease: See Chondrodysplasia
Omentum; omental cyst in Samoan child, 405
Omphalomesenteric Duct: See Vitelline Duct
Onychorrhexis: See Nails
Open Air Treatment, continuous, for pneumonia in children, 1388
education in open air schools in England and Wales, 107
preparation of teachers for open air school, 110
Third International Congress of Open Air Schools, 859
Ophthalmology, allergy as related to; literature for 1936, 1412
Ophthalmoplegia: See Eyes, paralysis
Orange peel, vitamin C content of; pharmaceutic preparations, 362
Orbit, lymphangioma in, 169
Orthodontia: See under Teeth
Orthopedic treatment of bilateral paralysis of hip muscles, 440
Orthophonia: See Speech, defects
Os Calcis: See Calcaneum
Ossification: See Bones, growth; etc.
Osteitis deformans; hereditary osteochondrodystrophia deformans, 944
fibrosa; osteodystrophia fibrosa combined with precocious puberty, pathologic pigmentation of skin and hyperthyroidism; report of case; review of literature, *806
fibrosa, probable case of Recklinghausen's disease, 656
Tuberculous: See under Bones
Osteo-arthropathy, hypertrophic, pulmonary, *795, 1409
hypertrophic pulmonary; Bamberger-Marie syndrome and hippocratic fingers, 391
Osteochondritis deformans coxae juvenilis, or Perthes' disease; results of treatment by traction in recumbency, 655
deformans juvenilis, or Legg-Perthes disease, 656
deformans juvenilis, Perthes' disease, 656
ischiopubica, 930
of lower end of left femur in child aged 5 years, 433
Osteodystrophia Deformans: See Osteitis deformans
Fibrosa: See Osteitis fibrosa
Osteogenesis Imperfecta: See Bones, fragility
Osteomyelitis: See also Frontal Bone; Jaws; Sphenoid Bone; etc.
abscess of apophysis of os calcis in child, 1411
acute; differential diagnosis in children, 1161
acute; etiology, symptoms, diagnosis and treatment in 80 cases, 166
acute, in children, 432, 1410
chronic, metallotherapy in conservative treatment of, 654
chronic, subperiosteal resection in, 656
complicating retropharyngeal abscess in infant of 6 weeks; recovery, 138
vaccine therapy for; resorption of sequestrum, 1162
Osteopecilia: See Osteosclerosis fragilis
Osteoporosis; Osteopsathyrosis: See Bones, fragility
Osteosclerosis fragilis, familial osteopecilia, 434
Ostrum, H. W.: Scurvy with unusual symptom, *73, 1420
Otitis Media, acute and chronic, sinus thrombosis and suppuration of petrous pyramid, 394
and toxicosis in infants, 397
anisocoria in diagnosis of, 1385
followed by mixed meningococcic and streptococcic meningitis, 1397
importance of middle ear inflammation and mastoiditis in infancy, 892
problem of severely deaf child, 948
scarlet fever and mastoiditis followed by unusual case of carbuncle of brain, with recovery, 960
Otolaryngology, allergy as related to, 891
Otorhinolaryngology, allergy as related to; literature for 1936, 1412
Ovary: See also Estrogens; Hormones
cyst, ruptured, in childhood, 917
effect of hypertension and hypotension of maternal hypophysis on genital gland of female fetus, 1160
embryology; effect of functional abnormality of maternal thyroid on genital gland of female fetus, 926
fetal, effect of functional abnormality in maternal pancreas on, 1160
fetal, effect of functional disturbance of maternal endocrines on, 1160
hormones, effect on basal metabolism of hyperthyroid rats, 420
tumor; carcinoma in girl 12 years of age, 917
tumors; teratoma of ovary; influence of endocrine glands on ovarian tumors in childhood, 917
Oxycephaly: See Acrocephaly
Oxygen, analysis; simple method for use in oxygen tent therapy, 941
injection for endarteritis obliterans in infant girl, 442
Therapy: See also under Pneumonia
therapy; activation of specific treatment of syphilis by subcutaneous insufflation of oxygen, 886
therapy; face mask for use in administering oxygen to new-born, 1098
Oxyuriasis; oxyuris vermicularis and appendicitis, 402
problem of therapy, *1276
treated with nicotine, followed by acute nicotine poisoning; report of case in child, 1173

Pacchionian Bodies: See Arachnoid
Pachymeningitis, acute, hemorrhagic, of infancy, 1397
Pain: See Abdomen, pain; etc.
Palate, cleft, 601
  form and dimensions during first year of life, 629
Pancreas, disease of, in infancy, 1145
  effect of functional abnormality in maternal pancreas on genital gland of female fetus, 1160
  relations to parathyroids and hypophysis, 424
Pancreatitis, hemorrhagic, steatonecrotic, with hemoperitonitis in syphilitic infant, 407
Pannus: See Trachoma
Paprika: See Capsicum
Paragonimiasis: See Distomiasis
Paralysis: See also Extremities, paralysis: Hemiplegia; Poliomyelitis; etc.
  Birth: See Paralysis, obstetric
  brachial, monoplegia, 152
  cerebral, infantile; cortical encephalomalacia, 633
  cranial; congenital disturbances of cranial motor nerves in 11 members of 1 family, 1149
  diphtheric, experimental; chronaxiometric studies of guinea-pigs, 1363
  due to posture, 636
  facial; clinical and electrical study of hereditary and familial partial facial diplegia, 169
  Infantile: See Poliomyelitis
  obstetric, as cause of clubhands and clubfeet, with amyotrophic abnormalities in legs and arms, 938
  spastic, with syphilis, shortening of ulna in cases of, 1374
  Werdnig-Hoffmann type; congenital myotonia, 167
Paranoia: See under Insanity
Paraplegia: See Extremities, paralysis; Spine, tuberculosis
Parasites: See Intestines, parasites; and under names of parasitic diseases
Parathormone: See Parathyroid, hormone
Parathyroid deficiency and tetany of new-born, 1217
  extract as cause of hypercalcemia, 99
  extract, influence on rate of disappearance of intravenously injected calcium chloride, 99
  hormone; changes in blood chemistry in parathyroid tetany and after administration of parathormone, 926
  hormone; effect of complete renal insufficiency on action of parathyroid hormone in dog, 420
  hormone in blood of pregnant women, 424
  hyperparathyroidism and rickets resistant to vitamin D therapy, *529
  hyperparathyroidism in renal disease, 1154
  hyperplasia secondary to unhealed rickets causing infantilism with bone changes and calcification in kidneys, 1162
  relations to hypophysis and pancreas, 424
Parathyroidectomy, Results: See Tetany
Paratyphoid: danger of paratyphoid from contact with ducks, 879
Parent problem, 1401
Paresis: See Dementia paralytica
Parotid gland: sialadenitis of parotid gland in new-born, 1100
Parotitis; histology of experimental mumps in monkey, 114
  meningitis in association with mumps, 872
  total and permanent deafness from, 892
Parsons, L. G.: Maturation of red cells, 953
Patch test: new tuberculin patch test, *1019
Paul, J. R.: Cutaneous infection in experimental poliomyelitis; neurosurgical studies, 679
Pectin Therapy: See under Diarrhea
Pediatric societies, directory of, 202, 452, 692, 966, 1204, 1432
Pediatrics and general medicine, 180
  common diseases in infants and children, 181
  common errors in pediatric practice, 941
  diseases of children in 1936, 1174
Pediatrics—Continued
  emotional aspect of childhood and practice of pediatrics, 1401
  practice in Cairo for 15 years, 1417
  scientific and social development of pediatrics in Hungary as seen by Italian pediatrician, 942
Pellagra: See also Vitamins, B
  existence of intrinsic deficiency in, 596
  treatment; successful treatment with "filtrate factor," 597
Pellizzi Syndrome; macrogenitosomia praecox, 1405
Pemphigus Neonatorum: See Impetigo neonatorum
  syphilitic, beginning on dorsal regions of hands and feet, 1129
Peptic Ulcer and abdominal pain in children; gastric syndromes, 406
  duodenal ulcer in 9 year old child, 1145
  gastric and duodenal ulcer in child, 406
  in childhood: case report, 145
  in children, 687
  in children; follow-up study, 1390
  perforated duodenal ulcer in 9 year old girl, 1394
  perforated, in Meckel's diverticulum, 1142
Percomorph Liver Oil: See under Rickets
Pericarditis, suppurative, acute, 390
Pericardium, adhesions; experimental study of cardiopericardial adhesions, 134
  broken needle in pericardium of child 1½ years of age, 392
  congenital absence of; report of case, 1132
Perineum, Fistula: See Fistula
Periosteum, dysplasia; report of case, 167
Periostitis, hyperplastic, in 3 month old premature infant, 928
Peritoneum, primary tuberculosis of, in infant, 1375
Peritonitis, acute, "primary," streptococcic, 1391
  pneumococcic, 1144
  primary, pneumococcic; recovery of acute serous type following type I serum treatment without surgical intervention, 1390
  primary, streptococcic, 402
  streptococcic, complicating scarlet fever, 1106
  Tuberculous: See under Peritoneum
Peritonsillitis: See Abscess, peritonsillar
Perthes' Disease: See Osteochondritis deformans juvenilis
Pertussis: See Whooping Cough
Peterman, M. G.: Immunization against scarlet fever, *89
Petroleum, dermatitis bullosa caused by, 1170
Petrous Bone: See under Temporal Bone
Phagocytosis; influence of lack of vitamin A in diet on phagocytosis-promoting properties of blood serum, 1350
Pharmacology, history of, *1066
Pharynx: See also Nasopharynx
  irritating cough caused by inflammation of pharyngeal lymphoid follicles; pharyngitis granulosa irritans, 139
Phenanthrene derivatives; estrogenic activities of some synthetic phenanthrene compounds and some oxidation products of theelol, 1158
Phenobarbital: See under Barbital and Barbital Derivatives; etc.
Phenylmercuric Subnitrate: See Mercury
Phosphorus in relation to pathogenesis of tetany of new-born, 1211
  metabolism in 3 cases of acromegaly (1 case of osteoporosis), 427
Phrenicectomy: See under Tuberculosis, pulmonary
Physical defects; relation of defects to growth of children of 21 states, 106
Physical Education and heliotherapy, 1174
  physical welfare of youth, 858
Physical examination of children, note on, 941
Physical therapy in pediatrics, 182
Phytobezoar: See Stomach, foreign bodies
Pick-Niemann's Disease: See Niemann's Disease
Pierce, J. A.: Unfamiliar rachitic syndrome, 1186

Pigmentation, cutaneous, anemia with: collapsed lower lobe of left lung, 611
cutaneous, in osteodystrophia fibrosa, *806
Pineal Gland; effects of pineal extract (Hanson); accruing retardation in growth and acceleration in development in successive generations of rats under continuous treatment with pineal extract, 422
rôle in growth and development, 921
Pingitore, N. E.: Scleredema adultorum (Buschke), with involvement of muscles in 11 year old boy, *322
Pinworm Infestation: See Oxyuriasis
Pirie, G. R.: Early recognition of cardiac impairment, 947
Pirquet Test: See Tuberculin Reactions
Pituitary Body and resistance to intoxications, infections and tumors, 425
carbohydrate hormone of anterior lobe of pituitary in blood in glycogen storage disease, 926
Diseases: See also Acromegaly; Laurence-Biedl Syndrome; Obesity; etc.
diseases; endocrine study of hypogonadism and cryptorchidism, 922
diseases; Fröhlich syndrome and aggressive-submissive behavior, 642
diseases; infantilism treated with anterior pituitary extracts, 651
dysfunction and glycogen storage disease, 1394
effect of hypertension and hypotension of maternal hypophysis on genital gland of female fetus, 1160
effect of interruption of supra-opticohypophyseal tracts on antidiuretic, pressor and oxytocic activity of posterior lobe of hypophysis, 649
functional impairment of anterior pituitary by follicular hormone, 427
grafts; effect of chronic implantation of rats with pituitaries of same species, 1157
grafts; experimental studies of replacement capacity and noncyclic behavior of homoplastic anterior pituitary grafts, 1158
growth factor, 920
histophysiologic mechanisms of hypophysis, 922
hormones; site of formation of posterior lobe hormones, 1157
hypophysectomy; maintenance of carbohydrate levels in fasted hypophysectomized rats treated with anterior pituitary extracts, 426
hypophysis and prepubertal period, 922
hypophysometry, 925
hypopituitarism, 653
immunization of hypophysectomized dogs with diphtheria antitoxin, 873
insufficiency; relation to function of stomach and bone marrow, 1161
polyuria, polydipsia (diabetes insipidus) and glycosuria resulting from animal experiments on hypophysis and environs, 420
relation to parathyroids and pancreas, 424
Simmonds' disease; report of case, 163
tumor of, 428
tumor, therapy for, 923
vitamin C content of, 1159
Pituitary Preparations: diabetogenic action of anterior pituitary independent of adrenals, 925
effect of anterior pituitary hormone on genital gland of female fetus, 1160
effects of oral administration of pituitary extract, 420
extract of hypophysis in treatment of diabetes insipidus, 428
maintenance of carbohydrate levels in fasted hypophysectomized rats treated with anterior pituitary extracts, 426
production of mammary secretion in male guinea-pigs by anterior pituitary extract, 924
prolactin; effect on secretion of breast milk, 950
stimulation of mammary secretion in dogs by anterior pituitary extract, 924
technic of hypophysial therapy in children, 923
Placenta extract and measles prophylaxis, 1112
extract, human, prevention and attenuation of measles by use of, 1111
extract (immune globulin, human); use in prevention and modification of measles, 1103
fluid in measles prophylaxis, 1103
galactogenic function of; experimental studies, 594
permeability for various micro-organisms and bacteriophages, 672
placental immunity; method of determining dosage of placental globulin in measles prophylaxis, 1345
Platyspondylisis: See Spine, abnormalities
Play utilized in construction of healthy mental attitudes, 644
Pleura, abnormalities, causing bowing of pulmonary artery in children with normal heart, 621
Pleurisy, exudative; prognosis and treatment, 129
Pleurodynia, Epidemic: See Myositis, epidemic
Pneumatocele of neck, 627
Pneumococci, Infections: See under Meningitis: Peritonitis; Pneumonia
origin of naturally occurring immune bodies in infants, 1081
recovered in lobar pneumonia in children: differentiation into etiologic groups; familial distribution, *1285
typing in infantile pneumonia, 400
typing; new rapid method for direct typing of pneumococcus in sputum in pneumonia, 399
Pneumonia: See also Bronchopneumonia
acute, with spontaneous pneumothorax in infant, 144
causing disturbances of circulatory system, 619
chronic, in infancy, 628
complicating retropharyngeal abscess in infant of 6 weeks, with recovery, 138
diagnosis; new rapid method for direct typing of pneumococcus in sputum, 399
encephalitis associated with; 2 cases, 152
"hilus pneumonia" in childhood, 142
in children, 141
infantile, determination of type of pneumococcus in, 400
lipoid cell, chronic, 1425
lipoid cell pneumonia; new method of identifying oil in lung, 1195
lipoid, conditions that may favor occurrence of, 625
lobar, experimental, in rat; method for study of therapy, 1139
lobar, in childhood; 5½ year clinical survey at municipal hospital, 1140
lobar, in children; differentiation of recovered pneumococci into etiologic groups: familial distribution, *1285
migrating, 897
oil aspiration, 1139
oxygen therapy in, 1140
staphylococcic, 142
treatment; results of blood transfusions in primary pneumonia, *23
treatment with continuous open air in children, 1388
with late roentgen signs, 897
Pneumoperitoneum, spontaneous, in new-born, 864
Pneumothorax: See also Pyopneumothorax
and bronchial collapse following thoracic injury, 400
Artificial, in Tuberculosis: See under Tuberculosis, pulmonary
dextropositio cordis in relation to pneumothorax in new-born, 369
due to aspiration of coffee bean or to its extraction, 897
in new-born, 863, 1098
nontuberculous, spontaneous, in child, 400
spontaneous, in infant, 144
spontaneous, of new-born, 1357
spontaneous, partial, with insidious onset remaining fixed for 5 years in child 12½ years old; pleural calcification, 143
spontaneous; 20 cases in children, 1388
tension, spontaneous, 894
Poison Ivy: See under Rhus

Poison Sumac: See under Rhus
Poisons and Poisoning: See also under Dyes; Spiders, bites; and under names of poisonous substances, as Lead; etc.
diagnosis and treatment in children, 1173
histopathologic changes in central nervous system in experimental exsiccosis and toxicosis, 415
Poliomyelitis, 120. See also Encephalomyelitis
acute, anterior, in Basel and in Basel children's clinic, 373
acute, anterior, in New York in 1935; review of 686 cases, *984
acute, epidemiology of, 118
anterior, in Kentucky during 1935, 867
anterior, severe visceral complications in; case report, 1104
atypical, with upper neuron involvement, 1105
causing brachial monoplegia, 152
convalescent serum from 1934 epidemic in Denmark, neutralizing value of, 1108
cortical form of, 874
diagnosis and treatment, 869
epidemic, 871
epidemic; malaria treatment after stage of acute paralysis, 1111
experimental, cutaneous infection in; neurosurgical studies, 679
experimental, factors of resistance in, 115
experimental, pathologic picture in, 608
experimental, vitamin C therapy and prophylaxis in, 1102
Heine-Medin disease, 120
immunity to virus diseases, particularly poliomyelitis, 867
immunization, *977
in Charlottesville, Va., and in adjacent county of Albemarle, 867
in North Carolina in 1935, 866
in Virginia during 1935, 866
lesions; visualization by intravital staining, 680
prevention of intranasally inoculated poliomyelitis in monkeys by means of chemicals instilled into nostrils, 97
problems; meningeal forms of Heine-Medin disease, 1110
racial incidence in United States, with special reference to Negro, 116
recurrences, 374
relation between nasal and humoral antipoliomyelitic substances, 1103
relation of weather conditions to poliomyelitis in state of New York, 607
susceptibility; is there any relation between resistance and susceptibility to poliomyelitis and diphtheria? 605
treatment in respirator; late results in 63 cases, 370
treatment of infantile paralysis, 1103
treatment with serum in Heine-Medin disease, 872
virus of Heine-Medin disease, 120
Pollen: See also Anaphylaxis and Allergy: Asthma; Hay Fever; Ragweed
sensitivity; passive transfer antibody; fluctuations of titer in treated and untreated hay fever, 1181
Pollenosis: See Hay Fever
Polyarthritis: See under Arthritis; Rheumatic Fever
Polycythemia; polycythaemia vera, "spray x-ray therapy" in, 134
Polydactylia: See Laurence-Biedl Syndrome
Polyneuritis: See Beriberi: Korsakoff Syndrome; Neuritis, multiple; Neurons, diseases
Polyuria: See Diabetes Insipidus
Poncher, H. G.: Rate of apposition of enamel and dentin, measured by effect of acute fluorosis, *757
Pons varolii; angioma of left brachium pontis, with associated aneurysmal varices, 1147
Poole, M. W.: Relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
Stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants; basic study, *726
Porencephaly, diagnosis and treatment of, 1395
Pork: virulent tubercle bacilli recovered from tissues of swine intended for food, 382
Porphyrin in Blood: See under Blood
in Urine: See under Urine
Postoperative Care: See Surgery, postoperative care
Posture, causing paralysis, 636
faulty, physiologic effects of correction of, 431
in relation to failure of abundant sunshine to protect against rickets, 1227
poor, corrective exercises for, 1416
Pott's Disease: See Spine, tuberculosis
Pregnancy: See also Fetus; Labor; Maternity; Obstetrics
and syphilis, 1122
antenatal supervision, 1099
blood in; electrophoretic mobilities and sedimentation velocities of red cells, 132
complicated by poliomyelitis, *999
diabetes mellitus and hyperinsulinism of newborn, 431
diet in, and resistance to infection, 1178
diet in; oil of wheat germ in obstetrics, 1093
diet of expectant mother; prophylaxis of infantile eczema, 662
ectopic; changes in transplanted ectopic fetus, 1356
effect of pregnancy and female sex hormones in modifying course of syphilis in experimental animals, 1122
herpes antiviral property of human blood in relation to pregnancy, 355
Hygiene: See under Maternity
Multiple: See Quadruplets; Twins
parathyroid hormone in blood of pregnant women, 424
urine in; effect of anterior pituitary-like hormone on blood picture in rabbits, 1158
urine in treatment of nonadipose boys showing genital dystrophy, 1406
Premature Infants, anoxemia in, 860
body weight in relation to body length in premature infant with body length less than 50 cm., 1357
care and feeding of; simple milk mixtures, 860
care of, Chicago city-wide plan for, 363
delivery and care of infant of diabetic mother, 365
development of, 862
feeding; simple milk mixtures, 601
hyperplastic periostitis in 3 month old premature infant, 928
morphologic blood pictures during first months of life, 621
neonatal mortality in Dublin, 111
nitrogen metabolism in; comparison of human milk and cow's milk, *1030
red cell counts and hemoglobin values compared with those of full term children, 887
relation between rickets and mental deficiency, 1354
treatment with hormones, colostrum and pregnancy serum, 603, 861
Prepuce: See Circumcision
Proctitis: See Rectum
Prolactin: See Pituitary Preparations
Prontosil: See Sulfanilamide and Sulfanilamide Derivatives
Prontylin: See Sulfanilamide and Sulfanilamide Derivatives
Propidon (Delbet Vaccine): See under Osteomyelitis
Prostigmin, Therapy: See under names of diseases, as Myasthenia
Protamine Insulinate: See under Diabetes Mellitus
Protein; absorption of unaltered protein from abnormal gastro-intestinal tract of human beings, 98
dietary, and regeneration of serum albumin, 685
in Blood: See Blood, proteins
in Cerebrospinal Fluid: See under Cerebrospinal Fluid
in Urine: See Albuminuria
intake; relation to nitrogen retention, *1037

Protein—Continued
metabolism; glycemic response to isoglycogenic quantities of protein and carbohydrate, 921
requirements and basal metabolism of children from 4 to 14 years old, *29
Protozoa: See also Intestines, parasites; Leishmaniasis; etc.
disease in man; new encephalitozoon causing granulomatous encephalomyelitis, 1196
Pseudarthrosis in children's surgical clinic, 440
Pseudohermaphroditism: See under Hermaphroditism
Pseudoleukemia, infantile; Cooley's anemia with cardiac hypertrophy, 388
infantile; Cooley's erythroblastic anemia, 1381
infantile; erythroblastosis in new-born with congenital edema, 1358
infantile; erythroblastosis with osteoporosis; Cooley's syndrome, 619
infantile; hemo-osteopathy of Cooley, 888
infantile; splenectomy in case of erythroblastic anemia (Cooley), 888
infantile; "spray x-ray therapy" in polycythaemia vera and erythroblastic anemia, 134
Psoriasis; diathermy in treatment of generalized psoriasis, 175
dietary therapy in children, 438
Psychiatry, medicine, law and juvenile delinquency, 1401
psychiatrist's view of problem of prevention in pediatrics, 1402
trends in, 1152
Psychology; child psychology for practical physician, 1153
Psychoses: See Insanity; Mental Diseases; Neuroses and Psychoneuroses; etc.
Pterygium Colli: See under Neck
Puberty: See Adolescence
Pubic bone, tuberculosis of, 1129
Public health; examples of health centers, 1355
Pulmonary valve; case of diffuse dilatation of pulmonary artery due to congenital insufficiency of pulmonary valve, 1134
Pupils, anisocoria in diagnosis of otitis media in infancy, 1385
bilateral pupillary anomalies; persistence of annular sinus, 931
Purpura, Hemorrhagic: See also Diathesis, hemorrhagic
hemorrhagic; acute thrombocytopenic purpura after varicella, 1102
hemorrhagic; cerebral hemorrhage complicating Werlhof's disease, 889
hemorrhagic; congenital thrombopenia, 1324
hemorrhagic; induced hypercalcemia; possible therapeutic relation to thrombocytopenic purpura, 99
hemorrhagic; menorrhagia occurring at onset of catamenia in patient with thrombopenic purpura, 134
hemorrhagic; results of splenectomy in thrombocytopenic purpura, 616
hemorrhagic; syndrome of Glanzmann's essential thrombo-asthenia in child, 1134
hemorrhagic; thrombocytopenic purpura due to food allergy, 1130
hemorrhagic; thrombopenia in childhood, 890
hemorrhagic; thrombopenic purpura associated with catarrhal jaundice; report of case, 1130
hemorrhagic; value of prognostic venom reaction in thrombocytopenic purpura, 132
hemorrhagic, with lymphocytosis; acute type and intermittent menstrual type, 1377
primary; allergic basis in children, 136
purpuric conditions in man and animals, 1380
thrombo-asthenic; syndrome of Glanzmann's essential thrombo-asthenia in child, 1134
Thrombopenic: See Purpura, hemorrhagic
Pyelitis, catatonia due to, 419
in infants and young children, 418
treatment with derivative of sulfanilamide in children, 649
Pyelonephritis; pyelo-ureterocystitis in early infancy associated with malformations of urinary tract, 1155
Pyemia: See Bacteremia; Septicemia; Staphylococci; etc.
Pyknolepsy, 903
repeated minor convulsions of childhood, 154
report of case, 1147
syndrome of, 1150
Pylephlebostenosis splenica; case of stenosis of splenic vein, 138
Pylorus, atresia of, 1390
obstructive disturbances of pylorus in infancy; indications for operation, 407
spasm; state of health of children who have suffered from pylorospasm, 902
stenosis, congenital; persisting roentgen signs at age of 10, 632
stenosis; foreign body in stomach of boy previously treated for pyloric stenosis, 632
stenosis, hypertrophic, treatment of, 148
stenosis, hypertrophic; 2 cases; treatment with eumydrin, 630
stenosis in child 22 months old, 145
Pyonephrosis in infant, 160
Pyopneumothorax, spontaneous, treatment of, 897
Pyramidon: See Aminopyrine
Pyuria: See under Urinary Tract

Quadruplets of Eynesbury; first 9 months of life, 671
Quincke's Edema: See Edema, angioneurotic
Quinine, Therapy: See under names of diseases, as Myotonia

Rabies, a continuing challenge, 122
experimental, in white mice; passive immunization, 1117
Rachitis: See Rickets
Radbill, S. X.: Streptococcic meningitis with recovery after mastoidectomy and intraspinal use of lyophil convalescent scarlet fever serum, 1420
Radiations: See Roentgen Therapy; Ultraviolet Rays; and under names of various diseases
Radius, abscess of, due to typhoid; Brodie's abscess, 432
Ragweed: See also Hay Fever
pollen; alum as adjuvant in sensitizing guinea-pigs to ragweed pollen, 935
Rapoport, M.: Influence of exposure to sunlight and vitamin D on lead poisoning in rats, 1184
Rat-bite fever, 376
Reading ability, congenital arithmetic disability and acalculia (Henschen), 915
problem and emotional factors in mental retardation, 642
Recklinghausen's Disease: See Neurofibromatosis; Osteitis fibrosa
Rectum: See also Enemas
disorders in childhood, *573
proctitis, importance of bacteriologic cultures for diagnosis of, 645
prolapse and intestinal allergy, 1413
Reflex; grasping (Moro) reflex, *240
shoulder sign, 411
tonic reactions of normal child due to position and movement, 413
Regan, J. S.: Endarteritis obliterans in infant girl, 442
Regeneration; internal secretion of embryonic tissues; biologic significance and importance in practical medicine; problem of regenerescence, 441
Reichert, J. L.: Infection of lower part of genital tract in girls, *459
Reproduction: See also Fecundity
influence of raw and sterilized milk on reproduction in rats, 106
Respiration; action of strychnine and ethyl strychnine on normal and disturbed respiratory function, 1346
depression by oxygen, 590
Physiology: See Vital Capacity
Quotient: See Metabolism
Respiratory Tract: See also Bronchi; Nasopharynx; Nose; Pharynx; etc.
allergy of eye, ear, nose and throat, 1136
complications in typhoid, 872
diseases; cultivation of virus of common cold in chorio-allantoic membrane of chick embryo, 622
diseases, epidemic in early life, 398

Respiratory Tract—Continued
diseases; experimental vaccination against colds in infants' home, 1136
disease, predisposing factors in preschool child, 626
diseases; use of sulfur dioxide in treatment of epidemic cold, 1383
Foreign Bodies in: See Foreign Bodies
infections, acute, hemotherapy in child with, 628
infections, acute, of ear, nose and throat, complicated with hematuria, 138
infections; fate of living bacteria introduced into upper respiratory tract of normal and intranasally vaccinated rabbits, 1081
infections in children, 1138
infections; origin of naturally occurring immune bodies for pneumococci in infants, 1081
infections; reactions to intracutaneous injections of nucleoproteins of pathogenic bacteria from upper respiratory tract of asthmatic patients, 894
infections; resistance of children to repeated nosocomial infections of upper respiratory tract, 894
infections; "running" nose; clinical recollections and reflections, 623
Rest; calcium and protein changes in serum during sleep and during rest without sleep, 590
Reticulocytes: See Anemia; Erythrocytes
Reticulo-Endothelial System; disease of Besnier-Boeck (rare form of reticulo-endotheliosis), 138
infectious hyperplastic reticulo-endotheliosis in evolution of granuloxanthomatosis of Hand-Schüller-Christian type, 1380
Reticulo-endothelioma, so-called histiocytoma of skin; solitary xanthelasmoid fibrosarcoma, 1414
Reticulo-Endotheliosis: See under Reticulo-Endothelial System
Retina, abnormality; infantile and congenital retinal fold, 1165
glioma treated by fractionated or divided dose principle of roentgen radiation, 657
glioma treated by radon seeds, 657
hemorrhage in new born, 1099
heredity of hyaline bodies of disk, 1166
inheritance of opaque nerve fibers in retina (papilla leporina), 435
massive retinal fibrosis in children, 931
retinoblastoma, roentgenographic diagnosis of, 169
tumors; von Hippel's disease; Lindau's disease, 932
Retinitis Pigmentosa: See Laurence-Biedl Syndrome
Rheumatic Fever and rheumatic heart disease in West Virginia, 377
ascorbic acid content of blood plasma reduced in rheumatoid arthritis, 655
blood in; reduced ascorbic acid content of blood plasma, 609
heart disease in; age at onset and of recurrences in 488 cases of juvenile rheumatism ushered in by major clinical manifestations, 1129
heart in; disappearance of physical signs of rheumatic heart disease, 615
heart in; 4 lead electrocardiogram of children, *265
heart in; management of rheumatic heart disease, 616
heart in; metropolitan and rural incidence and distribution of acute rheumatism and rheumatic heart disease in New South Wales, 1367
in northern California, 121
independence of chorea and rheumatic activity, 1115
malignant form in children, 877
mechanism of, 377
nose and throat in relation to rheumatic diseases, 1119
relation of Str. haemolyticus to "rheumatic" diseases, 377
subcutaneous rheumatic nodules with no carditis, 122
unusual subcutaneous rheumatic nodules, 123
vitamin C and juvenile rheumatism, 593
Rheumatism: See also Arthritis
Acute Articular: See Rheumatic Fever and scarlet fever, 1115
latent, of nervous system in children, 1121
psychic factors in rheumatoid arthritis, 927
relation to allergy, 879
Rhinitis, allergic, comparison of intradermal and intramucosal tests in, 890
allergic (vasomotor), statistical study of, 1383
use of rhinovasogen in pediatric practice, 1174
Vasomotor: See Hay Fever
Rhinorrhea: See under Nose
Rhus dermatitis, prophylactic action of extract of poison ivy in control of, 437
dermatitis, specific therapy in, 1167
Ribs; Luschka's deformity and other anomalies of ribs, 929
Richter, C. P.: Self-selection of diets by rats, 1180
Rickets, 105. See also Cod Liver Oil; Vitamins, D
and thyroid, 429
causing macroscopic formation of enamel deformities, 1416
congenital craniotabes; histologic observations in 5 cases, 434
deformities commonly regarded as due to, 927
experimental, 1354
experimental, hypertrophy of spleen in, 361
experimental, ultraviolet therapy in, 1090
failure of abundant sunshine to protect against, *1227
frequency in Brazil, 1092
in Havana, 1092
intestinal atony of, effect of vitamin D on, 1087
investigations on identical twins with respect to rickets, 109
iodine of blood of rachitic children, 597
mental deficiency and, 1153, 1354
ossification of carpus in, 432
plasma phosphatase in diagnosis and prognosis of, 1091
prevention; value of irradiated yeast in infants, 596
problem of calcification, 100
rachitis hepatica, 408
rachitogenic factors in cereals, 106
Renal: See Dwarfism, renal
resistant to vitamin D therapy, *529
treatment; antirachitic effectiveness of viosterol, cod liver oil and percomorph liver oil, 1087
treatment; effect of citrate and tartrate on experimental rickets, *548
treatment of, 1092
unfamiliar rachitic syndrome, 1186
zonular cataract and tetany in relation to rickets, 934
Right and Left-Handedness: See Left and Right-Handedness
Rigidity, progressive, unilateral, with choreoathetosis and torsion spasms about longitudinal axis, 638
Ringworm; dermatophytosis of feet, hands and groins, 663
of scalp; treatment, 1167
treatment with new trichophyton extract, 664
treatment with triethanolamine; adjunct to dermatologic therapy; ringworm of scalp, 660
Rocky Mountain spotted fever, eastern type of; report of case, 1117
Roentgen Therapy: See also under names of various diseases
Bucky rays in treatment of dermatologic diseases, 666
in disturbances of menstruation in young women, 919
Roentgenograms; method for successive examination of infinite number of parallel planes of object, 1418
Rosenberg, H. A.: Fate of children infected with tuberculosis during first 5 years of life, *15
Rosenthal, S. R.: Studies with BCG; focal and general tissue response and humoral response; intradermal route, *296
Roseola, exanthema subitum, 607

Ross, J. R.: Prolactin; effect on secretion of breast milk, 950
Rothstein, J. L.: Tubercle bacilli in gastric washings of infants and children; demonstration when cutaneous reaction to tuberculin is positive but there is no evidence of tuberculosis on physical or roentgenographic examination, *47
Roundworm: See Ascariasis; Nematodes
Rubella; encephalitis following German measles, 117
Rubeola: See Measles; Rubella
Rubin, M. I.: Influence of exposure to sunlight and vitamin D on lead poisoning in rats, 1184

Sachs-Tay's Disease: See Idiocy, amaurotic
Sacrococcygeal region, tumors of, 1164
Salicyl Compounds; absorption rate of salicylates and effect of certain compounds on rate of absorption of acetylsalicylic acid from stomach and intestine, 180
acute salicylate poisoning, 952
effect of acetylsalicylic acid on gastric activity and modifying action of calcium gluconate and sodium bicarbonate, 401
Saliva; absence of effect of swallowed saliva on coagulation of blood, 1133
Salmonella aertrycke; danger of paratyphoid from contact with ducks, 879
Breslau enteritis; epidemiologic, bacteriologic and clinical peculiarities of hospital epidemic, 378
enteritidis, effect of maternal diet on resistance to infection due to, 1178
infectious diarrhea in new-born caused by unclassified species of Salmonella, *1252
organisms causing meningitis, 1396
suipestifer in outbreak of food poisoning in Cape Peninsula, 97
Salts, metabolism in adrenal insufficiency and partial starvation in rats, 921
problem of sodium and chloride metabolism, 103
skeletal changes in rat induced by ration extremely poor in inorganic salts, 98
Sanes, S.: Dystrophy of liver in infancy and childhood, 948
Sarcoid, disease of Besnier-Boeck; rare form of reticulo-endotheliosis, 138
Sarcoma, Ewing's, of grave type; embryonic reticulosarcoma of bone marrow, 166
lymphosarcoma of mediastinum, 1141
lymphosarcoma of stomach, 1389
myeloblastic; systemic disease of myeloid tissue in children, 1411
sacrococcygeal tumor, 1164
solitary xanthelasmoid fibrosarcoma of skin, 1414
Sauer, L.: Present status of preventive inoculations against whooping cough, *979
Scabies; sulfur therapy in nursling, 671
treated with sodium thiosulfate, 659
Scalds, treatment with silver nitrate ointment, 667
Scalp, Diseases: See under names of diseases, as Ringworm; etc.
Scarlet Fever, 121
blood grouping in, 375
control, recent experiences in, 866
encephalomyelitis in, 1363
epidemics, mild, advantages and disadvantages of, 121
epidemiologic notes on scarlet fever in China, 1114
erysipelas in relation to scarlet fever, 1106
erythema nodosum associated with, 665
erythrocyte sedimentation rate in scarlet fever and its complications, 1106
hemolytic streptococcus and, 371
immunity; effect of lyophil pooled adult serum administered by mouth or positive Dick test as compared with other methods of administration, 1177
immunization, *89, *976
immunization; prevention and treatment of scarlet fever, 117
immunization; prophylactic and therapeutic use of scarlet fever convalescent serum, *561
Scarlet Fever—Continued
immunization; prophylaxis of scarlet fever: critique, 1360
infection of air of wards with Str. pyogenes, 1107
milk-borne, and sore throat outbreak, 369
milk-borne epidemic of, 117, 1360
nephritis in; familial disposition to nephritis in scarlet fever, 1111
nephritis in; prevention of postscarlatinal nephritis, 608
problems, 1361
rheumatism and, 1115
streptococcic peritonitis complicating scarlet fever, 1106
susceptibility of children with scarlet fever to diphtheria, 873
today, 869
treatment; intravenous or intraperitoneal antitoxin treatment combined with short isolation period, 371
visceral pathology in, 114
what is scarlet fever for clinician? 119
Scherp, H. W.: Immunologic relation of type-specific polysaccharide from type I meningococcus, 1175
Schick Test: See under Diphtheria
Schilder's Disease: See Encephalitis periaxialis
Schistosomiasis in Foochow area, 609
Schizophrenia: See Dementia praecox
Schlutz, F. W.: Effect of vitamin B intake on retention of iron in normal infant, 683
Utilization of organic and inorganic iron by normal infant, *252
Schmidt, W. M.: Human passive transfer antibody; neutralization of antigen, *777
Human passive transfer antibody; titration by neutralization, *288
Passive transfer antibody; fluctuations of titer in treated and untreated hay fever, 1181
Schools, admissions into, and problem of maturity in field of biology of child, 942
hygiene and sanitation supervision of, 859
open air in education in England and Wales, 107
open air schools, preparation of teachers for, 110
open air; Third International Congress of Open Air Schools, 859
Schour, I.: Rate of apposition of enamel and dentin, measured by effect of acute fluorosis, *757
Schüller-Christian Syndrome; infectious hyperplastic reticulo-endotheliosis in evolution of granuloxanthomatosis of Hand-Schüller Christian type, 1380
Schüller-Christian's disease, 1410
xanthomatosis, 432
xanthomatosis of skin and syndrome of Hand-Schüller-Christian, 390
Schwentker, F. F.: Treatment of meningococcic meningitis with sulfanilamide, 676
Scleras, blue, and clinical aspects of osteopsathyrosis, 928
blue, and periosteal dysplasia, 1162
Scleredema: See Scleroderma
Sclerema: See Scleroderma
Scleroderma and chronic arsenic poisoning in child, 942
case of sclerema neonatorum, 959
pathogenesis in relation to parasympathetic fiber, 665
scleredema adultorum (Buschke), with involvement of muscles in 11 year old boy, *322
sclerema neonatorum, localized type of, 863
Sclerosis, disseminated; forms of familial ataxia resembling multiple sclerosis; clinical study, 1395
disseminated, in mother and child, 641
disseminated; occurrence of epidemic encephalitis combined with multiple sclerosis, 908
multiple: See Sclerosis, disseminated
progressive, diffuse; progressive symmetrical familial centrolobar leuko-encephalosis (Schilder's disease), 908
tuberous, compared with von Hippel's disease: Lindau's disease, 932
Scoliosis: See Spine, curvature
Scorbutus: See Scurvy

Scott, H. V.: Cryptorchidism treated with gonadotropic hormones, 190
Scott, J. P.: Streptococcic meningitis with recovery after mastoidectomy and intraspinal use of lyophil convalescent scarlet fever serum, 1420
Screw Worms: See Myiasis
Scriver, J. B.: Case of sclerema neonatorum, 959
Scrofula: See Lymph Nodes, tuberculosis; Tuberculosis
Scrofuloderm: See Skin, tuberculosis
Scrotum, Fistula: See Fistula
Scurvy: See also Vitamins, C
and carditis, 1351
in twins, 1088
infantile, 1352
infantile, in Chile, 105
infantile; treatment with ascorbic acid, 851
latent in infants; capillary resistance of newborn and of infants during first year of life, 1352
latent in infants; content of cevitamic acid in blood serum of women in labor and children at birth, 1353
rôle in etiology of chronic subdural hematoma, 852
with unusual symptom, *73, 1344, 1420
Seaweed; origin of vitamin D and relation to solar radiation, 1183
Secretions, Internal: See Endocrine Glands
Semilunar bone; congenital synosteosis of semilunar and triquetral bones, 1163
Sensitization: See under Anaphylaxis and Allergy; Immunity; etc.
Septicemia: See also Bacteremia; and under specific organisms and diseases
fulminating, associated with purpura and bilateral adrenal hemorrhage (Waterhouse-Friderichsen syndrome); report of 2 cases; review of literature, 1115
meningococcic, chronic, 118
Septum, Nasal: See under Nose
Serby, A. M.: Peptic ulcer in children, 687
Serotherapy and Hemotherapy: See also Serum; and under names of diseases
"auto passive transfer," 448
Serum; antiserum response in human and mouse meningococcic infections, 1175
Bactericidal Properties: See Blood, bactericidal properties
Convalescent: See also under Measles; Scarlet Fever; Whooping Cough; etc.
convalescent, in prevention and modification of measles, *277
Immune: See under Diphtheria
immunologic relations of type-specific polysaccharide from type I meningococci, 1175
Sex Hormones: See under Hormones; Ovary; Placenta; Testicles; etc.
Intergrades: See under Hermaphroditism
Precocious Development: See under Adolescence
ratio at birth, statistical study of, 599
Sexual etiquette, culture of, in youth, 1403
Shapiro, M. J.: Four lead electrocardiogram of children, *265
Shaw, D. R.: Immunization against human influenza, 678
Shaw, E. B.: Comparative study of immunization, *973
Shaw, N. G.: Treatment of congenital syphilis; 6 years' work at children's syphilis clinic, Central Free Dispensary, Chicago, 687
Sherman, D. H.: Endarteritis obliterans in infant girl, 442
Shields, W. P.: Scurvy with unusual symptom, *73, 1420
Shigella: See under Dysentery
Shock, Anaphylactic: See Anaphylaxis and Allergy
coagulation of blood in anaphylactic and other types of shock, 444
Emotional: See Emotions
treatment; intravenous injection of hypertonic solution of sodium chloride in treatment of some conditions of low blood pressure, 887
Sicilians; biometric data and morphologic median of Cantanese new-born, 864
Sicklemia: See under Anemia
Sigmatism: See Speech, defects
Sigmoid disorders in childhood, *573
Silver in drinking water, relation to endemic goiter, 424
Nitrate: See under Burns
toxicity; argyria, 1172
Simmonds' Disease: See under Pituitary Body
Simpson, R. W.: Peculiar case of blindness, 957
Singer-Brooks, C.: Opsonocytophagic test in cases of pertussis and in cases of children vaccinated with antigens of H. pertussis, 1179
Sinus, Sigmoid: See Lateral Sinus
Sinuses, Nasal: See also Antrum; Frontal Bone
nasal; accessory nasal sinusitis in childhood; bacteriologic examinations, 622
nasal, conservative treatment of, 1384
nasal; development of accessory nasal sinuses, 893
nasal, diseases of; allergy as related to otolaryngology, 891
nasal; sinusitis, relation of staphylococci to, 1135
Skeleton: See Bones
Skin abnormalities; dermatorrhexis; report of case, 956
cancer in childhood, 182
dermatochalasis, case of, 175
Diseases: See also Dermatitis; under names of diseases, as Eczema; Herpes; etc.
diseases; endemic outbreaks caused by bites of Aedes cinereus, 439
diseases, treatment with Bucky rays, 666
fibrosarcoma; solitary xanthelasmoid fibrosarcoma; so-called histiocytoma of skin, 1414
gangrene; sphaceloderma; report of case of unusual phagedenic ulceration of skin, subcutaneous tissue and muscle or thoracic wall, 172
Pigmentation: See Pigmentation
Reactions: See also Anaphylaxis and Allergy; under specific headings, as Tuberculin Reactions; etc.
reactions; blister fluid used in passive transfer skin test, 438
staphylococcic lesions of; treatment with toxoid, 174
tuberculosis; atypical forms in Negro children, 661
tuberculosis; tuberculin reactions in children thought to have tuberculous lesions of skin, 128
Skull: See Cranium
Sleep; calcium and protein changes in serum during sleep and rest without sleep, 590
of young children in 24 hour nursery school, 914
Smallpox immunization, *975
propagation of variola virus in developing egg, 1105
pustulosis, acute, varioliform, 1115
Vaccination: See also Encephalitis, postvaccinal
vaccination; eczema vaccinatum, 1101
vaccination in simple treatment of angioma, 1169
vaccination, intradermal, 873
vaccination; number of incisions and influence on results, 373
vaccination, ocular complications of, 607
vaccination; postvaccinal exanthema, 1114
vaccination scratch; unexpected cause of death in hemophilic infant, 621
vaccine; titration of vaccinia virus on chorioallantoic membrane of chick embryo, 871
vaccine; vitro cultivation of filterable viruses with reference to vaccine, 871
Smell and taste in new-born, 864
Smith, C. H.: Food requirements of young infants, 194
Smith, G. E.: Subacute bacterial endocarditis, 947
Snakes, Venom: See Venom

Snelling, C. E.: Vitamin C requirements in childhood, 959
Soaps, eczematizing properties of, 174
effect of chemical constitution of soaps on action on diphtheria toxin, 1103
Societies, foreign, directory of, 202, 452, 692, 966, 1204, 1432
Georgia Pediatric Society, meeting, 849
International Congress of Open Air Schools, third, 859
international, directory of, 202, 452, 692, 966, 1204, 1432
local, directory of, 205, 455, 695, 969, 1207, 1435
national, directory of, 203, 453, 693, 967, 1205, 1433
pediatric, directory of, 202, 452, 692, 966, 1204, 1432
sectional, directory of, 203, 453, 693, 967, 1205, 1433
state, directory of, 203, 453, 693, 967, 1205, 1433

Society Transactions:

American Pediatric Society, 183, 442, 673
Canadian Society for Study of Diseases of Children, 944
Chicago Pediatric Society, 687
Philadelphia Pediatric Society, 1419
Society for Pediatric Research, 1175

Sodium Bismuthate: See under Syphilis
Mandelate: See under Urinary Tract, infections
metabolism, problem of, 103
Spasmophilia: See also Tetany
causing macroscopic formation of enamel deformities, 1416
prognosis of, 857
total blood calcium in spasmophilic children, 595
Spatz-Hallervorden Disease: See Lenticular Nucleus, degeneration
Speech defects; emendation of organic aspects of pathologic speech of mongolians, 1401
defects in abnormal children, 915
defects; orthophonic clinics in Austria, Denmark and Germany, 1384
defects; relation of malocclusion to sigmatism *520
development in oligophrenic child, 653
Sphaceloderma; unusual phagedenic ulceration of skin, subcutaneous tissue and muscle of chest wall; case report, 172
Sphenoid bone, osteomyelitis of; report of 2 cases, 1161
Sphincter muscles; sympathetic innervation of external sphincter of human bladder, *1012
Spiders, bite of spider; report of case, 180
knoppie, specific antivenene in treatment of bite of, 1173, 1417
Spiliopulos, G.: Similarity of erythroblastic anemia and chronic or congenital malaria; successful treatment of 8 patients with quinine, *60
Spina Bifida, *1012
and congenital atresia and stenosis of aqueduct of Sylvius; anatomic study of 4 cases, 633
and hydrocephalus, 414
mechanism of internal hydrocephalus in, 904
Spinach; comparative value of spinach and tomatoes in child's diet, 684, 946
Spinal Cord: See also Meninges; Nervous System; etc.
malformation, *1012
myelomalacia in 3 year old child, 411
Spinal Fluid: See Cerebrospinal Fluid
Spine, abnormalities; diagnosis of Klippel-Feil anomaly of cervical portion of spine, 928
abnormalities; Klippel-Feil syndrome, dystrophia brevicollis congenita, 603
abnormalities; platyspondyly, 1409
curvature, in hereditary osteochondrodystrophia deformans, 944
curvature; incomplete "block-vertebra" of upper thoracic spine, 168
curvature; scoliosis of new-born, 111
Spine—Continued
tuberculosis causing torticollis; case report, 1163
tuberculosis with paraplegia, 127
tuberculous spondylitis, with fusion of remnants of diseased vertebrae, 1376
Spleen, Hypertrophy: See Splenomegaly
Puncture: See under Leishmaniasis
reticulo-endothelium of spleen in essential thrombopenia, 1381
stenosis of splenic vein (pylephlebostenosis splenica); report of case, 138
Splenectomy: See Pseudoleukemia
Splenomegaly: See also Anemia, splenic; Niemann's Disease
hepatosplenomegaly; (?) idiopathic cirrhosis, 900
hypertrophy of spleen in experimental rickets, 361
in gargoylism, 601
with jaundice, 612
Spondylitis: See under Spine
Sporotrichosis, renal; case report, 918
Sports: See Athletics
Sputum; new rapid method for direct typing of pneumococcus in sputum in pneumonia, 399
Squint: See Strabismus
Stains, iodine; standardization for wet preparations of intestinal protozoa, 850
Staphylococci; action of antistaphylococcus serum in experimental staphylococcic infection in rabbit, 1368
aureus causing bone abscess simulating a cyst, 1162
aureus causing experimental pulmonary abscess, 397
aureus causing osteomyelitis of superior maxilla in new-born, 954
aureus, large primary abscess of liver due to, 146
aureus; staphylococcic sepsis in children, 878
hemolytic, food poisoning due to; small milk-borne epidemic, 403
immunity; natural antistaphylococcic immunity, 1369
immunologic specificity of, 1080
isolation of probable pathogenic staphylococci, 850
relation to sinusitis, bronchitis and bronchiectasis, 1135
staphylococcic pneumonia, 142
staphylococcic skin lesions; treatment with toxoid, 174
toxin, intradermal reaction to, 1369
Starvation; salt and water metabolism during partial starvation in rats, 921
Status Dysraphicus: See Nervous System, abnormalities
Status Lymphaticus: See Lymphatism
Status Pigmentatus: See under Lenticular Nucleus
Stearns, G.: Vitamin D requirement of child, 189
Steatorrhea: See Celiac Disease
Sternum, development of, *1213
ectopia cordis cum sterni fissura, 107
Puncture: See Bones, marrow
Stevens, H.: Lipoid cell pneumonia; new method of identifying oil in lung, 1195
Stewart, C. A.: Periodic accrediting of households; economical auxiliary method for controlling human tuberculosis, suitable for use in private practice, *699
Still's Disease: See under Arthritis deformans
Stillbirths: See Infant Mortality
Stillerman, M.: Acute anterior poliomyelitis in New York in 1935; review of 686 cases, *984
Stock, V. F.: Dermatorrhexis; report of case, 956
Stoesser, A. V.: Altered lipid metabolism in infections of children, 1182
Stokes, J., Jr.: Immunization against human influenza, 678
Stokes-Adams' Disease: See Heart, block

Stomach: See also Gastro-Intestinal Tract; Pylorus
abnormalities; partial thoracic stomach; report of case, 899
achylia gastrica and abdominal pain in children; gastric syndromes, 406
achylia; relation between diminished absorption of vitamin C and pathologic pigmentation in gastro-enteritis and achylia gastrica, 902
foreign bodies in; effect of posture on foreign bodies in stomach, 145
foreign bodies in; trichophytobezoar; report of case, 946
foreign body in stomach of boy previously treated for pyloric stenosis, 632
hernia; volvulus of inverted intrathoracic stomach complicating diaphragmatic hernia; case report, 1389
influence of drugs on human cardia, 1394
lymphosarcoma, 1389
physiology; absorption of undigested proteins from abnormal gastro-intestinal tract of human beings, 98
physiology; effect of acute hemorrhage on emptying time of stomach, 898
physiology; relation to anterior pituitary insufficiency, 1161
secretion, effect of dextrose on, 355
secretion; effect of mucin on infections by bacteria, 355
spasm; hydro-aerial cooing noise due to mediogastric spasm, 146
stasis of, 1144
thoracic, with short esophagus and diaphragmatic hernia, 1141
tubercle bacilli in gastric washings; demonstration when cutaneous reaction to tuberculin is positive but there is no evidence of tuberculosis on physical or roentgenographic examination, *47
Ulcer: See Peptic Ulcer
volvulus of inverted intrathoracic stomach complicating diaphragmatic hernia; case report, 1389
Stomatitis aphthosa associated with cutaneous anomalies, 632
due to vitamin B_2 deficiency, 597
gangrenous; cancrum oris following measles, 1107
Vincent's: See Angina, Vincent's
Stools: See Feces
Strabismus; convergence spasm, case of, 170
management of crossed eyes in children, 657
modern treatment of squint and prevention of blindness, 1165
surgical procedure for, choice of, 435
Streptococci: See also Erysipelas; Meningitis; Scarlet Fever; etc.
acute infection of middle ear, 395
acute infection of throat, 395
erysipelatis, action of dry bile obtained with various solvents on streptococci in vitro, 1346
green; relation of strains to clinical character of subacute bacterial endocarditis, 133
green-producing; relation to epidemic of pleurodynia, *231
hemolytic; acute bacterial endocarditis in infants; report of case, 389
hemolytic, and mechanism of rheumatic fever, 377
hemolytic, and scarlet fever, 371
hemolytic, bacteremia, 1116
hemolytic, bactericidal action of human serum on, 1080
hemolytic, causing meningitis; recovery, 1420
hemolytic; chemotherapy (sulfanilamide) in treatment of streptococcic infections of lung, pleura and thoracic wall, 951
hemolytic; effect of prontosil (sulfanilamide derivative) and related compound in hemolytic streptococcic infections, 1116
hemolytic, immunizing activity of certain chemical fractions isolated from, 1082
hemolytic; new approach to therapeusis of hemolytic streptococcic infections, 122
hemolytic; relation to "rheumatic" diseases, 377
Streptococci—Continued
hemolytic; study of streptococci isolated from throats of residents of New Orleans and New York, 891
infections treated with scarlet fever convalescent serum, *504
infections; treatment with para-aminobenzenesulfonamide (sulfanilamide) and its derivatives, 1416
peritonitis, primary, 402
pyogenes, infection of air of scarlet fever wards with, 1107
Viridans: See under Endocarditis
visceral pathology in scarlet fever and related infections, 114
Stridor, chronic, in infancy, 1426
Struma: See Goiter
Strychnine; action of strychnine and ethyl strychnine on normal and disturbed respiratory function, 1346
Therapy: See under names of various diseases, as Diphtheria
Suffocation; accidental mechanical suffocation among infants under 1 year old in different geographic regions of United States, 1925-1932; mortality rates, 626
Sugars: See also Dextrose; etc.
in Blood: See Blood, sugar
in Urine: See Diabetes Mellitus; Urine, sugar
Sulfanilamide and Sulfanilamide Derivatives: See also under Meningitis; Urinary Tract, infections; etc.
acidoses associated with administration of para-aminobenzenesulfonamide (prontylin), 1416
chemotherapy in treatment of streptococcic infections of lung, pleura and thoracic wall, 951
para-aminobenzenesulfonamide and its derivatives, 1416
therapeutic action of p-aminobenzenesulfonamide in meningococcic infection of mice, 1397
Sulfur Dioxide: See Respiratory Tract, diseases
therapy in nursling, toxic effects of, 671
Summerfeldt, P.: Comparative value of spinach and tomatoes in child's diet, 684, 946
Sunlight: See Heliotherapy; Light
Suprarenals: See Adrenals
Surgery of childhood, 937
postoperative care; prevention of pulmonary complications, 1140
surgical questions of pediatrics in practice, 177
Swanson, W. W.: Body content of certain minerals during fetal life; mineral storage, 686
Mineral composition of bone and cartilage of human fetus, *1025
Sweat glands, secretion of children, 1168
vitamin C content of, 360
Swimming; collapse while swimming; consequence of hypersensitiveness to cold, 1413
Swine: See Hogs
Sympathoblastoma; adrenal tumor in child, 926
Sympodia: See Monsters
Syndactylia: See Fingers and Toes, abnormalities
Synosteosis, congenital, of semilunar and triquetral bones, 1163
Syphilis: See also Neurosyphilis; under names of organs and regions, as Bones, syphilis; and under names of diseases, as Pemphigus, syphilitic; etc.
activation of specific treatment of syphilis by subcutaneous insufflation of oxygen, 886
and hemorrhagic steatonecrotic pancreatitis with hemoperitonitis in infant, 407
and pregnancy, 1122
causing dry gangrene of foot in new-born, 1358
causing subacute and chronic diseases of knee joint in childhood, 1163
changes in iris caused by syphilis, with congenital ectopia lentis, 171
congenital, 381
congenital, absence of part of occiput due to, 883

Syphilis—Continued
congenital, and epilepsy, 414
congenital, as cause of hydrophthalmos, 933
congenital; case of subacute meningitis due to hereditary syphilis, 128
congenital; demographic study in Italy, 1126
congenital, experimental; infectiousness of blood, uterus and placenta of pregnant rabbits with early syphilis, 1122
congenital in Chinese children, stovarsol treatment of, 386
congenital, in 1 of identical twins, 1371
congenital, in second and third periods of childhood, 1127
congenital, in "second" generation; report of case, 1376
congenital, intravenous use of acetarsone in, 125
congenital, ossification of carpus in, 432
congenital; shortening of ulna in cases of spastic paralysis with syphilis, 1374
congenital; spasmodic paraplegia with cerebral disturbance in congenital syphilis, 884
congenital, treatment of, 884
congenital, treatment of; 6 years' work at Children's Syphilis Clinic, Central Free Dispensary, Chicago, 687
congenital; treatment with acetarsone, 385
congenital; treatment with mapharsen, 957
experimental, effect of pregnancy and female sex hormones in modifying course of, 1122
experimental, sodium bismuthate soluble in, 1370
experimental syphilitic keratitis in rabbit, 881
fatality following bismarsen therapy, 126
Hereditary: See Syphilis, congenital
in infancy and childhood, 1371
incidence among school children of Kingston, Jamaica, 1372
lag phase in early congenital osseous syphilis; roentgenographic study, 124
Meinicke's reaction in, 1126
mucocutaneous (bejel), in Syria; results of dark field examination, 881
Serodiagnosis: See Meinicke Clarification Reaction; etc.
third generation case? 610
treatment; effect of rest on results of treatment and general benefit derived from therapy, 880
treatment; mapharsen in mass treatment in clinic for venereal diseases, 381
with asymptomatic fever and unusual course; report of case, 1125

Tachycardia: See Heart, rate
Tapeworm infestation; signs and symptoms of Taenia saginata infestation, 1368
Taran, L. M.: Paroxysmal atrioventricular nodal tachycardia in new-born, *557
Tarsus; bipartite first cuneiform bone, 929
Tartrate, effect on experimental rickets, *548
Taste and smell in new-born, 864
Tay-Sachs' Disease: See Idiocy, amaurotic
Teacher's preparation for open-air school, 110
Teeth: See also Dentifrices
caries, complete, of erupted permanent dentition in boy aged 13 years; agenesia of enamel, 669
caries; effect of diet on caries in South African Bantu, 179
dentition of fetus, 940
dermoid, in external auditory canal; comments on teratomas and dermoids, 622
diet and influence on caries in children's teeth, 178
disorders and dermatorrhexis; report of case, 956
enamel of; macroscopic formation of enamel deformities caused by rickets or spasmophilia; mechanism of evolution, 1416
fluorosis, chronic, endemic, 668
in relation to failure of abundant sunshine to protect against rickets, 1227
in relation to pediatric practice, 939
malformation and anomaly of, 940
malocclusion of; relation to sigmatism, *520
neonatal line in enamel and dentine of human deciduous teeth and first permanent molar, 669

Teeth—Continued
oral pathology in relation to avitaminosis, 1090
orthodontic treatment; when should it be instituted? 668
rate of apposition of enamel and dentin, measured by effect of acute fluorosis, *757
school dental service at Djursholm, 1931-1936, 940
school dental work; statistics, 940
Telangiectasis, multiple, of brain; hereditary factors in development, 410
Temperature, Body: See also Fever; Heat; etc.
comparison of oral, axillary and rectal temperatures; clinical study, 1424
cutaneous, in vertebral region, 174
external, influence on blood sedimentation rate, 1133
heat injury of nursling, 1174
hypothermia and edema, 937
Temporal Bone; acute and chronic otitis media, sinus thrombosis and suppuration of petrous pyramid, 394
petrositis with operation and recovery, 394
Tenia: See under Echinococcosis; Tapeworm, infestation
Teratoma; dermoid teeth in external auditory canal; comments on teratomas and dermoids, 622
mediastinal, in child 7 months old, *1057
of ovary; influence of endocrine glands on ovarian tumors in childhood, 917
Terplan, K.: Endarteritis obliterans in infant girl, 442
Testicles; excess of "male" (comb-growth and prostate-stimulating) hormone in virilism and pseudohermaphroditism, 422
undescended, and onychorrhexis, with recovery, 936
undescended; cryptorchidism; end-results of operation, with reference to ability to procreate, 919
undescended; cryptorchidism treated with gonadotropic hormones, 190
undescended; ectopia, 160
undescended; endocrine study of hypogonadism and cryptorchidism, 922
undescended; nonoperative (gonadotropic) treatment of cryptorchidism, 1154
undescended; perineal ectopia of testicle, 648
undescended; treatment of sexual underdevelopment with anterior pituitary-like hormone of pregnancy urine, 650
Tetanus, cephalic, with partial facial paralysis, 123
following prophylactic injection of serum, 879
observations on 22 cases of, 1120
researches on; distribution and fate of tetanus toxin in body, 609
toxins and toxoids; concentration and purification by ultrafiltration, 851
toxoid, alum-precipitated, refined, active immunization of allergic persons with, 1365
toxoid; antitoxic response in guinea-pigs immunized with tetanus alum-precipitated toxoid followed by tetanus spores, 876
treatment, 1367
treatment in pediatric division of Ospedale civile di Udine, 1369
Tetany: See also Spasmophilia
and nonobstructive periodic cyanosis of newborn; clinical study of cyanotic spell, 1357
of new-born, 862, 1098
outcome in infants treated in Würzburg University clinic, 1918-1925, 638
overbreathing, spontaneous, rôle of calcium in, 637
parathyroid; changes in blood chemistry in tetany and after administration of parathormone, 926
parathyroid, relation of serum phosphates to, 651
pathogenesis of tetany of new-born, *1211
relation to zonular cataract and rickets, 934
Tetralogy of Fallot: See Heart, abnormalities
Thaysen-Gee's Disease: See Celiac Disease
Theelin (Estrone): See Estrogens
Thermotherapy: See under names of diseases

Thorax: See also Heart; Lungs; Pleura; etc.
congenital defect of pectoral muscles, 860
injury, pneumothorax and bronchial collapse following chest injury, 400
Thorium Dioxide: See Arteries, cerebral
Thornton, A. J.: Failure of abundant sunshine to protect against rickets, *1227
Throat, acute streptococcic infection of, 395
and nose in 500 cases of asthma, 895
bacteriology; study of hemolytic streptococci isolated from throats of residents of New Orleans and New York, 891
septic sore throat, promptly reported milk-borne outbreak of, 138
Thrombo-angiitis; thrombo-arteritis in course of typhoid, 877
Thrombo-Arteritis: See Thrombo-Angiitis
Thrombocytes: See Blood, platelets
Thrombopenia: See under Blood, platelets; Diathesis, hemorrhagic; Purpura
Thrombosis, sinus: thrombosis of sigmoid sinus; clinical analysis, 1384
sinus, with acute and chronic otitis media and suppuration of petrous pyramid, 394
Thrush: See under Bronchi
Thumb: See Fingers and Toes
Thymoma: See under Thymus
Thymus and bone regeneration, 429
ectopic benign growths in larynx, 1385
enlargement and chronic stridor in infancy, 1426
Hypertrophy: See also Lymphatism
hypertrophy; cure in child 19 months of age by roentgen rays, 924
in response of organism to injuries and intoxications, 163
rôle in growth and development, 921
Status Lymphaticus: See Lymphatism
thymectomy, biologic effects of; accruing retardation in growth in succeeding generations, 422
thymoma and thymic hyperplasia in myasthenia gravis, 162
Thyroid, abnormality; effect of functional abnormality of maternal thyroid on genital gland of female fetus, 926
and rickets, 429
Diseases: See also Goiter
diseases and blood lipids, 426
disorders, creatine studies in, 423
dysfunction and vital and postmortem carbohydrate metabolism in glycogenosis, 1394
hormone; relation to vitamin A, 1159
Hyperthyroidism: See also Goiter
hyperthyroidism; effect of ovarian hormone on basal metabolism of hyperthyroid rats, 420
hyperthyroidism; effect on nitrogen balance in period of growth, 1191
hyperthyroidism in osteodystrophia fibrosa, *806
hyperthyroidism; surgical problems, 1407
Hypothyroidism: See also Cretinism; Myxedema
hypothyroidism and sporadic cretinism; roentgen study, 429
hypothyroidism, congenital, spontaneous remission in, 653
hypothyroidism, subclinical, in children, 650
hypothyroidism; subthyroid child, 421
hypothyroidism; treatment with gonadotropic hormone (anterior pituitary-like) of non-adipose boys showing genital dystrophy, 1406
insufficiency; endocrine study of hypogonadism and cryptorchidism, 922
preparation, effect on nitrogen balance in period of growth, 1191
relation to bone regeneration, 925
rôle in calorigenic action of vitamin D, 855
therapy; hormonal regulation of number of blood platelets, 618
tissue, ectopic benign growths in larynx, 1385
tumor; myxedema following removal of aberrant thyroid tumor, 425
Thyroxin; relation between thyroid hormone and vitamin A, 1159
Tick Fevers: See Typhus
Time utilization to best advantage, 1403
Tisdall, F. F.: Comparative value of spinach and tomatoes in child's diet, 684, 946
Tissue extracts; internal secretion of embryonic tissues; biologic significance and importance in practical medicine; problem of regenerescence, 441
growth; vitamin C and formation of intercellular material, 1089
Toes: See Fingers and Toes
Tomatoes; comparative value of spinach and tomatoes in child's diet, 684, 946
Tongue, carcinoma of, in new-born, 603
macroglossia in children; review of literature; report of case, 1328
Tonsillectomy; abscess tonsillectomy in diabetes, 925
and voice, 1386
Braun's, modification of, 1138
follow-up of patients 8 months after, 393
in peritonsillar abscesses, 396
performed in office, 394
relation to onset of poliomyelitis, *998
Tonsillitis: See under Tonsils
Tonsils, Abscess: See Abscess, peritonsillar
chronic tonsillitis, clinical symptoms of, 624
enlarged; relation to mental deficiency, 1153
hypertrophied, histologic picture of, 140
infection causing pharyngeal asphyxia in 4 year old girl with exophthalmic goiter, 429
nose and throat in relation to rheumatic diseases, 1119
physiology; is lymphatic tissue in nasopharynx protection against infection? 1386
roentgenotherapy of chronic tonsillitis, 139
tonsillogenic sepsis; prevention by abscess tonsillectomy, 624
Toomey, J. A.: Absorption of poliomyelitis virus by cholesterol, *1272
Torsion Spasm: See Dystonia musculorum deformans
Torticollis, etiology of case of, 1163
in children's surgical clinic, 440
Toxemia, otitis and toxicosis in infants, 397
treatment of intoxication in infancy, 1085
Toxin and Antitoxin: See under Diphtheria; Serum; Tetanus; etc.
Toxoid: See under Diphtheria; Tetanus; etc.
Trachea, Foreign Bodies: See under Foreign Bodies
in relation to chronic stridor in infancy, 1426
Trachoma; trachomatous keratitis; biomicroscopic study of 280 Indian school children, 1164
treatment in children, 437, 932
treatment of trachomatous conjunctivitis in children, 658
Transfusion: See Blood, transfusion
Trask, J. D.: Cutaneous infection in experimental poliomyelitis; neurosurgical studies, 679
Trauma; thymus and adrenals in response of organism to injuries, 163
Trematodes: See Distomiasis; Schistosomiasis; etc.
Tremor: See Encephalitis
Trichocephaliasis and high eosinophilia; case report, 380
enterocolitis and appendicitis caused by Ascaris and Trichocephalus, 147
incidence of intestinal worms, particularly of Trichuris trichiura in patients of Copenhagen University children's clinic, 379
Trichophytobezoar: See Stomach, foreign bodies
Trichuriasis: See Trichocephaliasis
Tricuspid valve, atresia, congenital, 617
Truncus Arteriosus: See Heart, abnormalities
Tubercle Bacilli, bovine, frequency in man of tuberculosis caused by, 130
bovine; rôle in etiology of tuberculous meningitis, 1124
focal and general tissue response and humoral response to intradermal injection of BCG, *296
in blood stream, verification of, 1129
in gastric washings; demonstration when cutaneous reaction to tuberculin is positive but there is no evidence of tuberculosis on physical or roentgenographic examination, *47

Tubercle Bacilli—Continued
isolated from school children at Ee, Netherlands, 387
mixed infection of meninges with Koch's bacillus and Friedländer's pneumobacillus, 1151
morphologic aspects of, 388
survival of oxygen and water deprival by, 1122
Tuberculin, possibility of sensitization to, 446
purified protein derivative of tuberculin (P. P. D.), 1369
Tuberculin Reactions, cutaneous; statistical study of reactions in Parisian children between 2 and 17 years of age, 885
economical auxiliary method for controlling tuberculosis, suitable for use in private practice; periodic accrediting of households, *699
in children thought to have tuberculous lesions of skin, 128
intracutaneous tuberculin test and use of fluoroscope in county survey, 126
mortality in tuberculin-positive infants, 381
new tuberculin patch test, *1019
percutaneous plaster tuberculin test in children, 386
Pirquet reaction in relation to different manifestations of tuberculosis, 1128
Pirquet test compared with new tuberculin patch test, *1019
present status and technic of tuberculin testing, 611
present status of tuberculin test, 610
statistics of cutaneous tuberculin tests performed on Parisian children, 383
survey of children in western Scotland, 1373
tuberculin titer; value in tuberculosis in children, 1376
Tuberculosis, 382. See also Tubercle Bacilli; and under names of organs, regions, etc., as Bones; Hand; Lymph Nodes; Skin; Spine; etc.
among inhabitants of Godthaab Colony in Greenland, 614
and pseudoreaction of Shick test, 384
avian; recovery of virulent tubercle bacilli from tissues of swine intended for food, 382
bacillemia in subjects suffering from erythema nodosum, 613
bacilli recovered from gastric contents, 612
BCG vaccination in western Europe, 880
BCG vaccine and tuberculous meningitis, 1375
BCG vaccine, antituberculous vaccination with, 1375
BCG vaccine; clinical results of Calmette protective vaccination (BCG), 385
BCG vaccine; death of new-born after ingestion of BCG, 884
BCG vaccine; reply to article by Gunther, 1375
BCG vaccine; studies with BCG; focal and general tissue response and humoral response; intradermal route, *296
BCG vaccine; technic of immunization against tuberculosis, 1124
BCG vaccine; tuberculin sensitivity of children receiving subcutaneous injections of BCG, 384
BCG vaccine used against tuberculosis in children, 380
BCG vaccine; vaccination with BCG, 1125
concealed and pulmonary tuberculosis in school children, 384
congenital; report of case, 1427
control; economical auxiliary method for control suitable for use in private practice; periodic accrediting of households, *699
development; factors influencing development of tuberculous infection in childhood, 881
diagnosis; evaluation of Ninni's experimental tuberculosis; frequency of open pulmonary tuberculosis in children with positive reactions to tuberculin, 385
diagnosis; selection of convalescent or tuberculous children, 1125
diagnosis; serodiagnosis test of Meinicke in childhood tuberculosis, 1127
experimental, thermotherapy in, 1123
Tuberculosis—Continued
fate of children infected during first 5 years of life, *15
first infection type in young adults, 380
hematogenous in infancy, 885
home contacts, examination of, 1371
immunization, *978
in childhood, 611, 1370
in new-born, 369
in 1937, 1125
in school children in Ee and on the Isle of Terschelling, in Netherlands, 386
intestinal, Korsakoff's syndrome in case of, 414
latent, and measles, 873
Meningitis Due to: See Meningitis, tuberculous
miliary, acute, clinically healed; report of case, 130
miliary, chronic, in children, 1123
miliary, congenital; report of case, 130
miliary; subacute pulmonary tuberculosis terminated by meningitis; anatomicoclinical study, 127
miliary, with bacilli in gastric contents; progressive improvement, 383
origins in infancy, 612
prevention; results of battle against childhood tuberculosis organized under medical supervision, 1125
primary foci of unusual types, 614
primary infection in, 1370
primary; initial states in infants, 1125
primary; sources of infection in childhood, 883
pulmonary, active, treatment of child with adult type of, 1370
pulmonary, and concealed tuberculosis in school children, 384
pulmonary, and erythema nodosum, 613
pulmonary, and fibrothorax in children, 143
pulmonary, and juvenile diabetes, 162
pulmonary, and stenosis, 613
pulmonary; artificial pneumothorax in children; 5 cases, 127
pulmonary; bronchopneumonia-tuberculous infiltration of lung, 1128
pulmonary; calcification during healing of primary tuberculous infection, 128
pulmonary; cavity in child of 10 months cured by phrenicectomy, 383
pulmonary; clinical and epidermiologic importance of tubercle bacilli in gastric content of children, 1375
pulmonary; clinical considerations in infant, 613
pulmonary; course during first stage in relation to age of patient, 131
pulmonary; demonstration of tubercle bacilli in gastric washings when cutaneous reaction to tuberculin is positive but there is no evidence of tuberculosis on physical or roentgenographic examination, *47
pulmonary; development of multiple primary complexes in lung, 128
pulmonary, during puberty, 1374
pulmonary; epituberculosis showing also bone lesions, 1374
pulmonary; fatal hemoptysis in child of 5, 626
pulmonary, in childhood, 886
pulmonary, Korsakoff's syndrome in case of, 414
pulmonary; mathematical study of decline of tuberculosis, 1127
pulmonary; new observations on symptoms of catalepsy in tuberculous children, 1126
pulmonary; pathology of pulmonary epituberculosis, 129
pulmonary; school epidemics caused by open pulmonary tuberculosis of pupils, 388
pulmonary; subacute miliary tuberculosis terminated by tuberculous meningitis; anatomicoclinical study, 127
pulmonary; 3 P's of phthisis, 126
pulmonary; vis medicatrix naturae, 387
sanatorium; danger of tuberculous infection of nurses, 387

Tuberculosis—Continued
statistics; clinical study of morbidity and mortality of 500 children of tuberculous mothers, 885
surgical, vitamin C reserves in, 593
surveys affiliated with family physician, 126
Tuberculin Reactions: See Tuberculin Reactions
virus; filtrable virus of tuberculosis, 387
whooping cough in tuberculous children, 115
Tularemia, epidemiology; spread of tularemia through water as new factor, 376
tularemic meningitis; report of case, postmortem observations, 1365
Tumors: See Angioma; Cancer; Sarcoma; etc.; and under names of organs and regions
Tuna oil, vitamins A and D in, 361
Turnoff, D.: Scurvy with unusual symptom, *73; 1420
Twins; albinism and unialbinism in twin African Negroes, *786
albinism in Mexican twins, *792
anthropologic study of skull of new-born, 1359
body weight in relation to body length in premature infant with body length less than 50 cm., 1357
celiac disease in twin, treatment of, 1145
epilepsy and hereditary disposition; incidence of epilepsy in similar monozygotic twins, 1398
epilepsy in; hereditary factor in epilepsy based on study of twins, 909
Gee-Herter's disease; new case in twin from Rikshospital, 148
heart in; influence of heredity and environment on size of heart; investigation based on twins, 885
hemo-osteopathy of Cooley in, 888
heredity in practice of pediatrics; study of twins, 944
hydrocephalus in; heredity, 1400
mongolian idiocy in, 156
mongolism in 1 of dizygotic twins; report of case, 156
pneumatocele of neck of 1 twin, 627
red cell counts and hemoglobin values of premature infants and twins compared with those of full term children, 887
rickets and tuberculous adenitis in identical twins, 109
scurvy in, 1088
speech development of oligophrenic child, 653
syphilis in 1 of identical twins, 1371
Tympanic Membrane: See under Ear
Typhoid, Bacilli: See also Bacteria, typhoid group
bacilli, immunizing antigen of, 1345
cardiovascular system during convalescence from, 879
carriers, agglutinism of, 1119
clinical and bacteriologic study in infancy, 1120
complications involving respiratory tract, 872
diagnosis in children, 608
fatty degeneration caused by excess of cholesterol esters in acute yellow atrophy of liver caused by typhoid; report of case, 378
immunization, *976
in children; study of 60 cases, 1117
serologically negative typhoid; confirmed by culture of bile, 609
thrombo-arteritis in course of, 877
Typhoid-like disease; systemic infection with B. pyocyaneus; review of literature; report of 7 cases, 610
Typhus fever, 376
outbreak of tick fever, 877

Ulcers: See also under names of organs and regions
Peptic: See Peptic Ulcer
Ulna, shortening of, in cases of spastic paralysis with syphilis, 1374
Ultraviolet Rays: See also Heliotherapy; Light; under names of organs and diseases
effect on phosphorus and dextrose of blood, 1085
Umbilical Cord; calcium and phosphorus content of cord blood in new-born, 1359
nonpulsating; possibility of child's being alive at birth, 114
Uncinariasis: See Hookworm Infestation
Undulant Fever, increasing importance of, 1118
serum therapy in human brucellosis, 1116
Urachus, congenital, patent, 860
Urea in blood and urine; simple method for determination, 1346
Ureters: See also Urinary Tract
dilated, bilateral, 647
pain as determined by faradic stimulation in man, 1404
surgery; ectopia vesicae treated by implanting ureters into bowel, 1155
transplantation in young, 1154
Urinary Tract: See also Genitals; Kidneys; Ureters; etc.
abnormality; congenital patent urachus, 860
calculi; changes and formation of calculi in urinary passages of white rats kept on diets rich in calcium, 920
calculi; lithiasis in infancy, 918
calculi; relation between formation of renal and vesical calculi and nutrition, 920
common urologic conditions in children, 646
infections, ammonium mandelate in treatment of, 646
infections, mandelic acid in treatment of, 646
infections; rate of excretion and bactericidal power of mandelic acid in urine, 646
infections; sodium mandelate as urinary antiseptic, *496
infections; treatment with derivative of sulfanilamide, 1128
malformations; clinical significance of 6 most important malformations of kidneys and ureters, 648
malformations; pyelo-ureterocystitis in early infancy associated with malformations of urinary tract, 1155
pyuria in children; treatment, 919
urology in children, 158
Urination, incontinence; enuresis, 418, 1403
Urine: See also Diuresis and Diuretics; Urination; under names of diseases; etc.
Acetone: See Acidosis
Albumin: See Albuminuria
alkalinity in young children as influenced by diet and disease, 1155
ammonia; ammoniacal diaper, 157
bilirubin; reducible by-product of Stokvis in urine of normal men, 1082
creatinuria in progressive muscular dystrophy, 1163
examination; test of Donaggio and muscular activity in child, 1162
Hormones in: See under Pregancy, urine in
ketone bodies; acetonuria in infancy, 853
levulose; blood in case of levulosuria, 419
levulose; essential fructosuria, 161
phenols; Millon's test in hepatic disease, 1394
porphyrinuria, congenital, 417
sugar; polyuria, polydipsia (diabetes insipidus) and glycosuria resulting from animal experiments on hypophysis and environs, 420
Urea: See Urea
vitamin C excretion in, 361
Urticaria pigmentosa without pigmentation, 935
Uterus, infection of, in girls, *459
Uvea; dyscephalodactylism (Vogt) and developmental anomalies of uveal tract, 108

Vaccination: See also Immunity; under names of various diseases, as Smallpox, vaccination; etc.
Encephalitis Following: See under Encephalitis
Vaccine Therapy: See under Tuberculosis; Whooping Cough; etc.
Vaccinia: See Cowpox; Smallpox, vaccination
Vagina, infection in girls, *459
Vaginitis: See Gonorrhea
Varicella: See Chickenpox
Varicose veins, "congenital," 135
Variola: See Smallpox

Veins, splenic, stenosis of; pylephlebostenosis splenica, 138
Varicose: See Varicose Veins
Venereal Diseases: See Gonorrhea; Neurosyphilis; Syphilis
Venoclysis: See Injections, intravenous
Venom; "knoppie-spider" antivenene, 1173
Therapy: See under Epilepsy; Purpura; etc.
Ventriculography: See under Brain
Vero, F.: Scleredema adultorum (Buschke), with involvement of muscles in 11 year old boy, *322
Verruca; endemic occurrence of warts, 439
plana, pigmentary form of, 660
Vincent's Angina: See under Angina
Viosterol, antirachitic effectiveness of, 1087
antirachitic potency of ergosterol activated by low velocity electrons; clinical evaluation, 1350
influence on rate of disappearance of intravenously injected calcium chloride, 99
shadows in bones, calcium and phosphorus content of, 930
Virilism, adrenal, 424
excess of "male" (comb-growth and prostate-stimulating) hormone in, 422
Viruses, culture; cultivation of virus of common cold in chorio-allantoic membrane of chick embryo, 622
culture; vitro cultivation of filterable viruses with reference to vaccine, 871
immunity to virus diseases, 1365
immunity to virus diseases, particularly poliomyelitis, 867
Viscera, complete transposition of, 1356
total inversion, dextrocardia associated with, 391
visceral pain, mechanism of, 1173
Vision: See Blindness; and under Eyes; etc.
Vital capacity; respiratory capacity in various diseases, 1388
Vital Statistics; birth rate in Vienna, 1094
clinical and statistical study of morbidity and mortality of 500 children of tuberculous mothers, 885
demographic study of congenital syphilis in Italy, 1126
fertility and relations to social conditions, 858
maternal and child health work in South Carolina, 1096
Vitamins: See also Cod Liver Oil: Deficiency Diseases; Diet and Dietetics; Milk; Rickets; etc.
A: See also Carotene: Cod Liver Oil
A and D in tuna oil, 361
A content of oil of wheat germ in practical pediatrics and obstetrics, 1093
A deficiency, cutaneous manifestations of, 857
A deficiency: influence of lack of vitamin A in diet on phagocytosis-promoting properties of blood serum, 1350
A, effect on rise in blood sugar, 598
A, histologic studies of effects produced by large doses of, 857
A, hypovitaminosis A, 598
A, influence on bactericidal power of whole blood in children with various infectious diseases, 1120
A, new sources and uses, 105
A; relation of hypovitaminosis to dark adaptation, 105
A, relation to thyroid hormone, 1159
A, therapeutic value in measles, 117
and immunity, 598
and promotion of normal and abnormal growth, 362
B and G and pellagra and other manifestations due to lack of these vitamins, 856
B; bacterial resistance in B deficient dogs, 855
B complex, 597
B deficiency, self-selection of diets by rats with, 1180
B; effect of brewer's yeast on blood production, 596
Vitamins—Continued
B, effect on retention of iron in normal infant, 683
B; preparation of concentration of vitamin B_1 and B_2 from brewer's yeast, 104
B utilization and retention; quantitative study in young children, 855
B_1 and B_2; preparation of concentration of vitamins B_1 and B_2 from brewers' yeast, 104
B_1 deficiency, biochemical lesion in; application of modern biochemical analysis in diagnosis, 104
B_1 deficiency, bisulfite binding substances in blood in, 1090
B_1, relation of increased vitamin B (B_1) intake to mental and physical growth of infants, *750
B_1; stabilizing effect of increased vitamin B (B_1) intake on growth and nutrition of infants; basic study, *726
B_1 therapy, present evaluation of, 1087
B_2 deficiency, stomatitis due to, 597
C: See also Scurvy
C and formation of intercellular material, 1089
C and hemorrhage, 105
C and juvenile rheumatism; vitamin C reserves in surgical tuberculosis, 593
C, ascorbic acid and glutathione in cow's milk in Manchuria and Mongolia, 359
C, ascorbic acid content of Manchuria paprika, 359
C, cevitamic acid content of blood plasma, 682
C, cevitamic acid content of some common foodstuffs, 858
C, cevitamic acid content of various parts of central nervous system and peripheral nerves, 1352
C consumption, 599
C content of breast milk, seasonal variations in, 1352
C content of cow's milk and cow's milk mixtures, 1092
C content of food available for young infants, 1352
C content of hypophysis, 1159
C content of mother's milk as affected by change of climate, 1092
C content of orange peel; pharmaceutic preparations, 362
C content of sweat, 360
C content of urine and feces of new-born, 1101
C deficiency, excretory test for, 1091
C; effect of antiscorbutic vitamin on oxalic acid content of blood, 1092
C; effect of cevitamic acid on proliferation of monocytes, 1380
C, effect on rise in blood sugar, 598
C excretion in urine, 361
C; influence of cevitamic acid on diuresis, 1351
C, influence on anaphylactic shock, 598
C; metabolism and importance of iodine in young organism; relation between iodine of blood and vitamins, 594
C metabolism in children, 103
C, reduced ascorbic acid content of blood plasma in rheumatic fever, 609
C, reduced ascorbic acid content of blood plasma in rheumatoid arthritis, 655
C; relation between diminished absorption of vitamin C and pathologic pigmentation in gastro-enteritis and achylia gastrica, 902
C; relation of adrenal cortex to, 855
C requirements in childhood, 959
C storage by normal adults after period of low intake, 596
C synthesis in animal organism, role of fat-soluble vitamins in, 361
C therapy and prophylaxis in experimental poliomyelitis, 1102

Vitamins—Continued
C treatment of pertussis, 874
D: See also Cod Liver Oil; Rickets; Viosterol
D and A in tuna oil, 361
D and calcium in metabolic processes, 1088
D content of oil of wheat germ in practical pediatrics and obstetrics, 1093
D deficiency, relation to tetany of new-born, 1222
D, effect on intestinal iron reduction, 1087
D in aqueous solutions, deterioration of, 1091
D in blood serum, estimation of; clinical applications, 1184
D; influence of diet on caries in children's teeth, 178
D, influence on lead poisoning in rats, 1184
D intoxication, 1087
D irradiated and vitamin D yeast-fed milk, prophylactic value of, 855
D of fish oils, multiple nature of, 1350
D, origin and relation to solar radiation, 1183
D requirement of child, 189
D; role of thyroid in calorigenic action of, 855
D, therapeutic value in measles, 117
Deficiency: See Beriberi; Deficiency Diseases; Rickets; Scurvy; etc.; and under specific vitamins
E content of oil of wheat germ in practical pediatrics and obstetrics, 1093
fat-soluble; role in synthesis of vitamin C in animal organism, 361
G: See Vitamins, B
in children's diets, 1088
in infantile therapeutics, 598
therapy in daily practice, 1093
vitaminized foods and commercial vitamin concentrates, 104
Vitelline duct; persistent omphalomesenteric duct, 107
Vocational guidance, role of physician in, 441
Voice and tonsillectomy, 1386
Vollmer, H.: New tuberculin patch test, *1019
Volvulus: See under names of organs, as Intestines; Stomach
Vomiting, acetonemic, in childhood; case report, 148
cyclic, mild and severe, food allergy in, 144
periodic, with acetonemia, insulin treatment of, 1144
persistent; gastric stasis, 1144
severe; use of maternal blood in treatment of severe vomiting in infant, 901
Vulva, Diphtheria: See Diphtheria, vulvar infection in girls, *459
Vulvovaginitis, Gonococcic: See under Gonorrhea

Warkany, J.: Estimation of vitamin D in blood serum; clinical applications, 1184
Relation of endocrine disturbances to certain heredodegenerative symptoms, 194
Warren, V. C.: Girdle type adiposity among mentally deficient males, *1257
Warts: See Verruca
Water, drinking; relation between occurrence of endemic goiter and presence of traces of silver and barium in, 424
Hemlock: See Cicuta
in body; metabolic studies of changes in body electrolyte and distribution of body water induced experimentally by deficit of extracellular electrolyte, 851
Metabolism: See Dehydration; Diuresis and Diuretics; Edema; Sweat Glands
spread through water as new factor in epidemiology of tularemia, 376
supply and fluorosis, *757
Waterhouse-Friderichsen Syndrome: See Adrenals, hemorrhage
Waugh, T. R.: Case of sclerema neonatorum, 959
Weather: influence of air conditions on incidence of bacillary dysentery, 673
relation to poliomyelitis in state of New York, 607
Weech, A. A.: Dietary protein and regeneration of serum albumin, 685
Weight: See under Body: Obesity
Weil's Disease: See Jaundice, spirochetal
Werlhof's Disease: See Purpura, hemorrhagic
Wheat Germ Oil: See Pregnancy, diet in; Vitamins, E
Wheatley, G. M.: Mediastinal teratoma in child 7 months old, *1057
Wheatley, M. A.: Respiratory metabolism in infancy and childhood; nitrogen metabolism in premature infants; comparative studies of human milk and cow's milk, *1030
Whooping Cough, 119, 1364
bacillus, response of leukopoietic system to toxins of, 1360
cardiac changes in pertussis, 1114
diagnosis, 1108
diagnostic significance of blood counts, 119
followed by deafness of central origin, 119
immunity; prophylaxis, treatment and bacteriology, 372
immunization, 115, *977, 1363
immunization; B. pertussis vaccine preparation, 1359
immunization; interim report of Cleveland experience, 1360
immunization; present status of preventive inoculations, *979
immunization, progress report on, 866
in tuberculous children, 115
pathogenesis and treatment of, relations of acid-base equilibrium to, 370
review of recent work on, 1105
tests; complement fixation tests in pertussis, 1102
tests; intradermal tests for susceptibility to whooping cough, 1108
tests; opsonocytophagic test in cases of pertussis and in children vaccinated with antigens of H. pertussis, 1179
treatment and diagnosis; new method, 875
treatment; antipertussis serum, 1110
treatment; results obtained with cowpox serum, 1111
treatment with vitamin C, 874
vaccine, known and unknown features of, 606
vaccine; report of case of severe whooping cough with response to pertussis vaccine (Sauer), 115
Wilkins, L.: Rates of growth, osseous development and mental development in cretins and in dwarfs, 193
Williams, H. H.: Lipid partition of erythrocyte stroma, 1192
Willis' Circle: See Brain, blood supply
Wilson's Disease: See Lenticular Nucleus, degeneration
Wintergreen: See under Salicyl Compounds
Wishart, D. E. S.: Problem of severely deaf child, 948
Wolf, A.: Granulomatous encephalomyelitis due to encephalitozoon; new protozoan disease of man, 1196
Wolf, I. J.: Relation of malocclusion to sigmatism, *520
Wolman, I. J.: Chronic lipoid cell pneumonia, 1425
Lipoid cell pneumonia; new method of identifying oil in lung, 1195
Worms: See Hookworm Infestation: Intestines, parasites; Nematodes; etc.
Wounds; tissue response to subcutaneous injection of cod liver oil, 360
Wright, W. H.: Studies on oxyuriasis: problem of therapy, *1276

Wrist: See also under Semilunar Bone
ossification of carpal centers in Negro children in Cape Town, South Africa, 590
Wryneck: See Torticollis
Wyatt, T. C.: Erythrophagocytosis in anemia of new-born; 2 case reports, 1191

Xanthoma, familial; report of 3 of 5 siblings with xanthoma tuberosum multiplex, 172
juvenile, or nevoxantho-endothelioma, 658
Xanthomatosis: See Anemia, splenic; Niemann's Disease; Schüller-Christian Syndrome; Xanthoma
Xeroderma pigmentosum, 660
Xerophthalmia, keratomalacia, 934

Yannet, H.: Effect of hyperthermia on distribution of water and electrolyte in brain, liver and muscle, 183
Yeast, Brewer's: See Vitamins, B
irradiated; antirachitic value in infants, 596
prophylactic value of vitamin D irradiated and vitamin D yeast-fed milk, 855

Zizmor, J.: Roentgen studies of children with alimentary disturbances due to food allergy, *1239